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Vol. LX.] [Part I.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY,

MARCH, 1897.

The Interpretation *of* Criminal Statistics.

By the Rev. William Douglas Morrison.

[Read before the Royal Statistical Society, 15th December, 1896.
The President, John B. Martin, Esq., in the Chair.]

Criminal statistics of an official character are a product of the present century. In France these statistics date from the year 1825, and the form and method of constructing them has remained practically unaltered up to the present time. Criminal statistics were introduced into the Austrian empire in the year 1850. In England criminal statistics date from the year 1857. The criminal statistics of Italy date from 1880, and those of Germany from 1882. Some of the smaller European States, such as Belgium, Holland and Scandinavia publish criminal statistics on a comprehensive scale. On the other hand the criminal statistics of the United States and Switzerland are only prison statistics. This is owing to the fact that these countries do not possess a uniform criminal code.

In consequence of representations made by me in articles in the "Nineteenth Century," in "Mind" and elsewhere, the criminal statistics of England and Wales have recently been revised and improved. I am glad to observe that the editor has been following out the lines laid down for him in these articles in his introduction and in the statistical tables.

For the purposes of the present address I will divide criminal statistics into three fundamental branches: the first branch consisting of police statistics, the second branch consisting of judicial statistics, and the third consisting of prison statistics. I am well aware that the subject matter of criminal statistics is sometimes divided up in a different manner, and I do not desire to claim exclusiveness or finality for the method which I now adopt. As a matter of fact the manner in which the contents of criminal statistics may be divided and differentiated depends to a considerable extent on the objects in view. If, for instance, we are anxious to know how the criminal law is operating and how it is

being administered, we shall analyse and classify the contents of criminal statistics from that point of view. If on the other hand we desire to know the movement of crime, the criminal condition of the community and the relative value of the several methods by which these matters are to be ascertained, we shall adopt a somewhat different method of classifying the contents of criminal statistics. I have ventured to classify criminal statistics into police statistics, judicial statistics and prison statistics because I desire, at least in the first place, to point out the amount of weight to be attached to each of these methods of recording the nature and the proportions of crime.

Police statistics from our point of view may be conveniently defined as a body of returns relating to the number of offences annually reported to the police, and to the number of apprehensions effected by the police as a result of those reports. Statistics of this character are the most comprehensive account to be obtained of the annual dimensions of crime. Neither prison statistics nor judicial statistics can lay the same claim to completeness as police statistics. Prison statistics only take cognisance of the offender if he happens to be imprisoned as a result of judicial proceedings. In a very considerable number of cases offenders are not sent to prison even when judicial proceedings terminate in a conviction.

Let us give an illustration of this fact. According to the official returns for the year 1892 (p. 17), the approximate number of convictions in England and Wales amounted to 589,532. But the number of prisoners of all kinds committed to local prisons, whether on conviction or remand or for trial during a closely corresponding period, only amounted to 172,225 (p. 25). Thus we see that less than a third of the convicted population is ultimately committed to prison. This fact conclusively shows that prison statistics are not nearly such a comprehensive return of the total annual amount of crime as the statistics of convictions.

But the statistics of convictions in their turn are not so comprehensive as the statistics of cases tried. Let us illustrate this point by a second reference to the returns for 1892. According to these returns the number summarily proceeded against amounted to a total of 711,243; but of this number 131,338 were not convicted. In a certain proportion of the cases discharged it is probable that no offence coming within the operation of the criminal law had been committed. But even after making allowance for these cases, a very large number would remain; and as far as regards the remainder, the failure to convict would arise because the wrong person was before the court or because the evidence as to guilt was insufficient.

From a consideration of all these facts I draw the conclusion in the first place that prison returns are not such a complete index of the annual amount of crime as the returns of convictions; and in the second place, that conviction returns are not such a complete index as trial returns. These conclusions bring me to the last point, namely, the relation between the returns relating to cases tried and the returns relating to apprehensions and offences reported to the police. It hardly requires to be stated that the number of apprehensions and the number of offences reported to the police are a more complete index of the annual volume of crime than either the statistics of trials, convictions or imprisonments. The statistics of offences reported to the police are the most complete of all. These statistics are more complete than the statistics of apprehensions, for the very simple and obvious reason that large numbers of crimes are being constantly reported for which no one is ever apprehended. I will take an illustration of this fact from the official statistics for 1894 (p. 49). According to the police returns the annual average of prosecutions for indictable offences in 1890-94 amounted to 56,070. But the number of indictable crimes reported or known to the police for the same period amounted to 83,777. It will be seen from these figures that a very high percentage of the cases of serious crime never get beyond the stage of being reported to the police. It will also be seen that the number of serious offences known to the police is vastly in excess of the apprehensions effected, and is therefore a fuller record of the annual amount of serious crime.

But it would be a mistake to suppose that the number of crimes known to the police is a complete index of the total yearly volume of crime. The actual number of offences annually committed is always largely in excess of the amount of officially recorded crime. This arises from a variety of causes. In the first place all official returns, however accurately and comprehensively they may be constructed, can only deal with cases which come to the ears of the authorities. But it is hardly necessary to observe that a considerable number of offences of almost every description are constantly being committed which do not reach the ears of the authorities at all. Mr. Chamberlain made a statement at Birmingham a few years ago in which he said that the Society for the Prevention of Cruelty to Children had dealt with no fewer than 8,810 cases of criminal cruelty in the course of ten years. Of all these cases only 1,497 were brought to the notice of the police. In a report to the Town Council of Manchester, the Chief Constable stated that in 1891 commercial houses were robbed by persons of good education of sums amounting in all to upwards of 90,000*l.*, and that in most cases the perpetrators of these offences

were not prosecuted at all. Instances of a similar character to those just mentioned might be multiplied a hundredfold, but these instances are sufficient to show that the amount of crime reported is a very inadequate index of the amount of crime committed. The silence, stealth and secrecy which play so essential a part in the operations of most criminal offenders must always have the effect of preventing the State from arriving at an exact estimate of the full extent of crime. On this grave subject, as well as in many other matters of the highest social importance, we must be contented with approximations.

I will now proceed to deal with the second branch of criminal statistics, namely, judicial statistics. Judicial statistics are concerned with the number and nature of offences for trial, and the result of the proceedings whether in the shape of acquittal or conviction. These statistics, as I have already stated, are not so comprehensive as the statistics of offences known and reported to the police. But compensation is, in many cases, a law of statistics as well as a law of life. What judicial statistics want in comprehensiveness they gain in accuracy and minuteness. Police statistics relating to the number of offences committed must contain a certain percentage of false and frivolous charges, and in so far as this is the case they are an incorrect and untrustworthy representation of the criminal condition of a community. To what extent police returns are rendered unreliable by recording false accusations, frivolous accusations, and imaginary offences it is of course impossible to say; but they must contain a considerable number of them, and this fact alone, to a certain extent, vitiates their value. It is partly on this account that the criminal statistics of the chief continental States do not contain a record of cases reported to the police. English, Scotch and Irish criminal statistics contain this record in so far as serious crime is concerned. I think, on the whole, the official returns of the United Kingdom are right in presenting a record of crimes committed.

The value of such a record can be amply justified on one ground alone. As I have already pointed out, the statistics of crimes committed is only an approximate index of the full extent of crime. These statistics omit many offences which do not come under the cognisance of the criminal authorities, and they include many charges which are afterwards found to be without foundation. These are serious and inevitable defects, and if the statistics of crimes reported to the police possessed no compensating advantages, it would not be worth while retaining them in the official returns of crime.

Happily these returns possess at least two great compensating advantages: they enable the community to ascertain the efficiency

of police administration, and in the second place they are in many ways a good test of the extent to which the population is in sympathy with criminal law. Let me proceed to illustrate the first of these two points. The efficiency of police administration in its capacity as an agency for the detection and apprehension of criminals is to be measured to a considerable extent by the relation which exists between the number of offences reported to the police and the number of persons prosecuted or convicted. According to a return in the English criminal statistics for 1894 (p. 49), it appears that there were prosecutions in 67 per cent. of the cases of crimes reported to the police, and convictions in 50 per cent. of the cases reported to the police in the years 1890-94. With certain reservations the efficiency of the police is to be measured by the percentage of prosecutions and convictions on the number of offences reported. As is truly pointed out in the official statistics for 1894, the real efficiency of the police is somewhat higher than the percentage of persons prosecuted and convicted would at first sight imply. But this circumstance does not affect the point with which I am at present concerned. That point is, that the returns of offences reported to the police are not so valueless as some continental statisticians seem to suppose. These returns when compared with the returns of prosecutions and convictions are on the whole a fairly satisfactory index of the efficiency of police administration. This general statement is, however, subject to one important reservation:—it is a statement which only holds good when a community is living under normal political, social and economic conditions. Whenever a community is seriously affected by any extraordinary conditions of the character just mentioned, then the percentage of trials and convictions to crimes committed ceases to be an index of police efficiency. The reason of this is that all unusual disturbances in the body politic affect the attitude of the population towards the criminal law. Whilst such disturbances are in existence considerable sections of the population are less in sympathy with the law. In such circumstances it is more difficult for the police to get evidence and information from the general public. The presence of this difficulty at once diminishes the efficiency of the police, and raises the percentage of cases which escape trial and conviction.

The effect of abnormal conditions in the community on the efficiency of the police will help to illustrate the second point to which I now wish to call attention, namely, the value of the statistics of crimes committed as an index of the general attitude of the population towards the criminal law. Where a country possesses an efficient police force, and the statistics of crimes com-

mitted, together with the statistics of offenders tried and convicted, exhibit a high percentage of unpunished crime, the reasonable inference is that the community in which this state of things exists is hostile to the criminal law, or at least to certain portions of the criminal law. This is always an ominous condition of affairs. It is calculated to arouse the earnest solicitude of statesmen and administrators wherever it exists. In the end law of all kinds, criminal as well as civil, is resting on public opinion. Its practical if not its ultimate sanction is public opinion, and its coercive power is dependent on the extent to which it is supported by public opinion. As soon as public opinion as a whole, or even a considerable section of public opinion, is hostile or indifferent towards the criminal law, the effect of this hostility or indifference is immediately seen in a diminution in the number of persons tried or convicted when compared with the number of offences committed. A concrete illustration of this principle is the low percentage of offenders apprehended and tried in Ireland for agrarian offences committed. Most of these agrarian offences consist of malicious offences against property. According to the Irish official statistics the number of malicious offences against property of an agrarian character committed in 1888 amounted to 776. The number of persons apprehended for these offences only amounted to 121, and of this number only 63 were ultimately bailed or committed for trial. The exceedingly small proportion of persons apprehended and tried when compared with the number of crimes committed, arises from the notorious fact that the Irish people are out of sympathy with the law relating to agrarian offences. Therefore those statistics are valuable as a warning to statesmen, administrators and the public, that a certain section of the population is for some reason out of sympathy with at least a portion of the criminal law. Inasmuch as penal law is resting on public opinion, such a condition of things can never be regarded as satisfactory.

It is the merit of police statistics to call attention to facts of this character. These facts do not come to light with the same fulness in the judicial statistics. The only manner in which judicial statistics shed light on the attitude of the population towards the criminal law is in the percentage of convictions to the number of cases tried. Where the percentage of convictions to the number of trials is low, this usually arises from the fact that it is exceedingly difficult to get evidence. When there is a difficulty in procuring evidence, this means that the population is unwilling to co-operate with the criminal authorities; it is a proof that the law is not supported by public opinion. But the full extent to which the law lacks this support is not brought out in judicial

statistics; police statistics alone provide us with this information. It is for this reason that their place cannot be properly filled by judicial statistics, as some continental statisticians are inclined to believe.

I trust I have now dealt in sufficient detail with the inadequacy of judicial statistics or, in other words, the statistics of trials and convictions as the most satisfactory test obtainable of all the features connected with the criminal condition of the community. I will now confine my remarks to the contents of judicial statistics The first observation to be made upon the point is that judicial statistics, and in fact criminal statistics as a whole, increase in accuracy in proportion as judicial proceedings are developed. The fact has already been referred to that the statistics of offences committed and of offenders apprehended are less accurate than the statistics of cases tried. It has now to be remarked that the statistics of cases tried are in their turn less accurate than the statistics of convictions. The reason that convictions are more accurate than trials rests upon the following considerations. In the first place, until an offence has been submitted to the judgment of a properly constituted tribunal it is impossible to say in what the offence has actually consisted, or whether an offence of a criminal character has been committed at all. It is a matter of every day occurrence, especially in courts of summary jurisdiction, for a supposed offender to be discharged on the ground that no offence has been committed coming within the operation of the criminal law. The statistics of trials include all these cases, and in so far as they include these cases the statistics of trials are an incorrect representation of the criminal condition of the population.

The statistics of trials also include a number of cases in which the offender is convicted for a different offence from the one with which he is charged. In 1894, for instance (see "Criminal "Statistics," p. 27), 97 persons were indicted for murder. Of these 97 persons, 31 were either acquitted or found insane, whilst 66 were convicted. But of the 66 convicted only 29 were convicted of murder, that is to say of the offence for which they were tried; the remaining 37 were convicted either of manslaughter, or of concealment of birth, or of procuring abortion. The result of these criminal proceedings in trials for murder shows that the statistics of cases tried are not such an accurate representation of the actual offences as the statistics of convictions. When all the evidence connected with the case is gone into and is subjected to the minute and searching scrutiny of a court of justice, it is frequently found that the charge preferred against the offender is different from the offence for which he is ultimately convicted. It is possible of course that there are cases in which the charge

preferred at the trial is a correct statement of the actual offence, while the conviction only represents what has been legally proved; but the broad distinction between the value of the two sets of statistics is that in the one case—the case of trials—we are dealing with probabilities which have not been legally established, while in the other case we are dealing with charges which have been substantiated by all the machinery of a court of law. It is therefore justifiable to conclude that the statistics of convictions are the nearest possible approximation to the actual facts.

I hope I have now succeeded in showing that the accuracy of criminal statistics increases with the development of judicial proceedings. My next step will be to show that the accuracy of criminal statistics increases with the gravity of the offences. Statistics relating to offences of a comparatively simple character, such as drunkenness, offences against the Education Acts, and many other offences of a somewhat similar description, are not on the whole so accurate as the statistics of grave offences against person and property. The reasons for this are obvious. Where offences are not of a serious character there is not the same disposition on the part of the public to report them to the police. A case of drunkenness, for instance, is not so likely to be reported to the police as a case of theft; a case of theft is not so likely to be reported as a case of burglary, and a case of burglary is not so likely to be reported as a case of murder. In addition to these circumstances it is to be recollected that the activity of the police in hunting down offenders is also determined to a considerable extent by the nature of the offence; when the offence is of a comparatively trifling character, it is not so much in the interests of social security that the offender should be apprehended as when the offence is of a serious character. It is not, for example, so much in the interest of social security that a petty thief should be arrested, as that a person charged with murder should be arrested. Again, in that large class of offences which are known on the continent as *contraventions*, and many of which can hardly be described as criminal, the annual numbers will depend to a very large extent on the orders given to the police. If it is at any time considered necessary that these contraventions should be strictly dealt with, the police will receive orders to this effect from the administrative authorities; greater vigilance will immediately be exercised in relation to these offences; the judicial statistics will record a greater number of such cases for trial. But in such circumstances it would be a mistake to suppose that there has been an actual increase of such cases in the community; the increase may be entirely accounted for by the increased vigilance of the police.

On the other hand, cases may diminish in the official records of crime if the police are more forbearing in the exercise of their functions. Let us take drunkenness as a probable instance of this fact. During the last twenty years, the proportion of persons tried for drunkenness to every 100,000 of the population has on the whole steadily decreased.

Trials for Drunkenness per 100,000.

1874–78.	1879–83.	1884–88.	1889–93.	1893.	1894.
812	698	636	615	568	595

But it is very difficult to say whether this decrease in the official returns represents an actual decrease in the amount of drunkenness, or whether it merely represents a greater amount of leniency on the part of the police in dealing with the intemperate portion of the population. The report of the Registrar-General gives some colour to the latter view. In his fifty-third annual report the Registrar-General says that: "The deaths attributed to "intemperance have increased year by year since 1884, and in "1890 were both absolutely and relatively to the population more "numerous than in any previous year." In connection with this important statement of the Registrar-General it is to be recollected that there may now be somewhat greater accuracy in registering deaths due to excessive drinking. But even after making allowance for this probability, it is hard to reconcile the Registrar-General's returns with the criminal returns. The Registrar-General's returns point to an increase of intemperance. The criminal returns point to a decrease. Both returns are resting on statistical data, and both are pointing in opposite directions. It seems to me that the most obvious way of reconciling these conflicting returns is to suppose that the police are becoming more forbearing toward the intemperate classes. If this should turn out to be correct, we should have to infer that the decrease of intemperance as measured by the decrease of trials for this offence before the criminal courts must be accepted with considerable reservations. It may be a decrease produced entirely by the action of the authorities, and may not represent a real decrease in the proportions of intemperance. Other illustrations of the effect of the attitude of the authorities on the statistics of petty crime might easily be adduced, but enough I think has been said to show, first, that the officially recorded fluctuations of petty offences are not always to be accepted as an accurate index of the real movement of these offences; and,

secondly, that petty crime is not such a correct index of the criminal conditions of a community as serious crime.

The manner in which the trustworthiness of judicial statistics is determined by the nature of the crime will assist us in dealing with the exceedingly difficult and complicated question as to whether crime is increasing or decreasing among civilised communities. I will now address myself to this problem, and to the difficulties which surround a satisfactory solution of it.

It is as well to state at the outset that all competent statisticians are agreed that the movement of crime in a community cannot be determined by a reference to the movement of the prison population, or, in other words, by an appeal to prison statistics. Prison statistics relate to the movement of crime by tabulating the annual number of committals to prison, and by registering the average prison population throughout the year. I will endeavour in the first place to show the inadequacy of the number of committals and of the daily average prison population as a test of the fluctuations of crime. For this purpose I will select the English returns relating to the prison population. According to these returns (see Appendix I) the daily average prison population, both in local and convict prisons, has decreased almost continuously year by year during the last seventeen years. At first sight this continuous diminution of the prison population looks exceedingly like a corresponding decrease in the amount of crime. But a closer examination of the matter shows that a decreased prison population is not necessarily produced by a decrease of crime. The daily average prison population depends on the duration of sentences, and not on the amount of crime. If sentences are being made longer by the sentencing court, the prison population—other things being equal—will increase in numbers, even if there has been no corresponding increase in crime. If on the other hand sentences are being sufficiently shortened the prison population will diminish, even if there is an increase in the amount of crime. As far as the average prison population is concerned, twelve men sentenced to one month apiece do not count for more than one man sentenced to twelve months. If, as an act of clemency to celebrate the anniversary of the longest reign in English history, the sentences on every prisoner were to be commuted to one-half of their original term, the prison population would diminish one-half. Considerations of this character at once explain why the prison population cannot be accepted as a test of the movement of crime. I had occasion to press these considerations on public attention a few years ago when wild statements were flying about as to the decrease of crime based upon a decrease of the prison population. It is of

course to be admitted that if sentences were of the same length at the present day as they were about twenty years ago, then the prison population would be an approximate index of the movement of crime. But we know as a matter of certainty that sentences are not so long now as they were twenty years ago. Even within the last ten years there has been a marked tendency towards reducing the duration of sentences. I will take as a statistical instance of this notorious fact the figures relating to sentences of penal servitude passed at sessions and assizes in 1883 and 1893. Penal servitude, I need hardly remind you, is a form of imprisonment in which the sentence ranges from a minimum of three years to a maximum of detention for life. It will be seen (by consulting Appendix II) that in the year 1883 the number of persons sentenced to penal servitude at assizes and quarter sessions amounted in round numbers to 121 in every 1,000 convictions. Ten years afterwards, in 1893, the number of persons sentenced to penal servitude only amounted to 99 in every 1,000 convictions. These figures exhibit a very material decrease in proportion of sentences to penal servitude in the short space of ten years. If the figures are looked at in detail it will be seen that the length of sentences to penal servitude has diminished as well as the proportion of persons sentenced.

Exactly the same state of things is reproduced when we examine the sentences to imprisonment passed at sessions and assizes during the ten years already mentioned. The duration of imprisonment ranges from a single day to two years. The proportion per 1,000 sentenced on conviction to imprisonment dropped from 835·26 in 1883 to 802·20 in 1893. Side by side with the drop in the proportion of sentences to imprisonment there runs a corresponding drop in the length of these sentences. This may be illustrated by two instances. In 1883 the number per 1,000 sentenced to more than one year amounted to 116·15. In 1893 the number sentenced to more than one year only amounted to 81·41. In 1893 the number per 1,000 sentenced to more than six months amounted to 265·27. In 1893 the number sentenced to more than six months dropped to 119·44. It is obvious from these figures that the length of sentences, as well as the numbers sentenced to imprisonment, has considerably diminished within the last ten years. According to the criminal statistics for 1894, this process of reducing the length of sentences and of substituting other penalties in lieu of imprisonment is still going on. This process may be comprehensively described as a mitigation of the severities of the criminal law. The rigours of the criminal code are being relaxed, owing to the wholesome growth of more humane feelings

in the community and among the administrators of justice. The effect of this change in public sentiment is reflected in a diminution of the prison population. But we must beware of confounding this diminution in the number of offenders under detention with a corresponding decrease in the proportions of crime.

Before leaving the subject of the relation between prison statistics and the movement of crime, I will take note of one or two objections to the line of argument I have adopted in discussing the mitigation of sentences. In the first place it may be alleged that sentences are shorter now than they were some years ago, because the offences for which the criminal population is tried are not so serious as the offences committed ten years ago. This would be a sound objection if it were based upon facts, but unfortunately it is not. The two most serious classes of offences are crimes of violence against person and property.

If we take the annual average of these offences for the five years 1879-83, and compare them with the annual average of the five years 1889-93, it will be found that offences of the most serious description have increased in the latter period. In 1879-83 the number of persons tried for indictable offences against the person amounted to 2,332. In 1889-93 the number of similar cases tried amounted to 2,585. Again, in 1879-83 the number tried for crimes of violence against property amounted to 1,834; in 1889-93 the number of such cases amounted to 1,883. (Appendix III.)

Broadly speaking these returns show that there has been no decrease in the most serious kinds of crime within the last ten years. The contention that sentences have been shortened because the gravity of crime has decreased has no foundation in fact.

There is still another objection which requires to be met: that objection is that a larger proportion of offenders sentenced to-day are not so hardened in crime as was the case with offenders sentenced ten years ago. Unfortunately this objection must also be driven off the field. All criminal statistics both in this country and abroad tend to show that the percentage of habitual offenders coming before the criminal courts is steadily on the increase. A portion of this increase may be accounted for by the perfecting of our identifying machinery. But improvements in identifying machinery will not alone account for the statistical increase of recidivism. It is my firm conviction that recidivism is increasing not because sentences are being shortened but because penal law and penal administration usually aggravate the conditions which have originally made a man a criminal. If these adverse conditions are aggravated it follows as a matter of certainty that the casual offender degenerates into a habitual

criminal. He swells the proportion of recidivists who come before the criminal courts.

Without pursuing the subject any farther I think we may now safely come to the conclusion that the decrease of committals to prison and the shortening of sentences which have taken place during the last generation do not arise from the fact that crime has become less serious or because there are fewer habitual criminals, but from the fact that the penal law has become distinctly milder in its operation. In the case of juveniles this increased mildness exhibits itself in the practical abolition of imprisonment for all children under 16 years of age. For these children admonition, probation, recognisances, fining, educational institutions are more and more taking the place of the prison cell. In the case of adults, with the exception of educational institutions, exactly the same methods are at work, and when loss of liberty has to be resorted to as a punishment the duration of detention within a local prison or in penal servitude is being shortened year by year.

I shall now proceed to deal with judicial statistics, or the statistics of trials and convictions as a test of the movement of crime. The criminal statistics of the German Empire take the returns relating to convictions as the most accurate test of the movement of crime in Germany. I have already pointed out that convictions are more accurate than trials because it is impossible to say with exactitude what sort of crime has been perpetrated till the matter has been impartially examined by a court of justice. French, Italian and English criminal statistics found their comparisons of one period with another on the basis of cases tried. In analysing the English returns I will adopt the English method of comparison, although it is not quite so accurate. As I have already stated, the more serious the offence, the more accurate it is as an index of the movement of crime. The most serious class of offences in this country are indictable offences. What do the returns teach us as to the number of persons tried for these offences during the last twenty years, and how are these returns to be interpreted? According to the returns (Appendix III) the total number of indictable offenders tried has increased since 1874-78. But it is to be recollected that there has been a considerable increase in the population since 1874-78. In order to make an exact comparison between now and twenty years ago, we must ascertain whether this increase has kept pace with the growth of population. A reference to the figures in Appendix IV will show that the total number of indictable offenders tried has not increased with the increase of the general population. The only classes of indictable offences which have increased faster than the growth of

population are sexual offences and robbery with violence. In every other class the percentage of offences to the population has diminished.

Before proceeding to appreciate the value of these returns, I will venture upon one remark as to the manner in which the table exhibiting the proportion of indictable offences to the population is constructed. A reference to the contents of this table will show that in estimating the proportion of indictable offenders tried, the total population of England and Wales is taken as the basis of comparison. Where criminal statistics are concerned, I submit that it is a mistake to take the total population in making computations. A vast number of the population have not reached the age of penal responsibility, and are therefore legally incapable of committing an indictable offence. In England all children aged less than 7 are under the age of criminal responsibility; they do not come within the operations of the criminal law. According to the last census these children amount to almost five millions; and although they are criminally irresponsible, they are included in our present returns relating to the proportion of indictable offenders to the general population. In estimating the proportion of offenders tried to the population, only that portion of the community should be included which has attained the age of penal responsibility; to include babies in arms and others in similar circumstances in such a computation is a manifest absurdity.

We will, however, take these statistics as they stand as an approximate index of the proportion of indictable crime to the general population. These figures no doubt show that although the total volume of indictable crime has increased since 1874-78, it has not increased as rapidly as the growth of population. Are these figures to be accepted without any modification? I propose to show that they are not. In discussing the decrease of the prison population I have pointed out that it has almost entirely arisen owing to a decrease in the duration of sentences and the substitution of other penalties, such as fining, etc., in lieu of imprisonment. This process I attributed to the growth of humane feeling in dealing with the delinquent population. The adoption of a milder attitude towards criminal offenders is not confined to a mitigation of the penalties inflicted on them after trial and conviction; it exhibits itself in a variety of forms, and its concurrent effect is to diminish the proportion of indictable offenders tried before the courts. Quite recently a judge sitting in one of the London courts stated that there was a growing unwillingness on the part of the public to prosecute. It would be difficult to produce statistics to show the extent to which this feeling prevails,

or the extent to which it has grown within the last twenty years. But if this indisposition to prosecute has grown with as much rapidity as the growth of leniency to offenders who are tried and convicted, it would at once explain the diminution in the proportion of indictable offenders tried to the general population. In these circumstances we should have a statistical decrease in the number of indictable offenders which would not represent a real decrease in the proportions of indictable crime. Again, it is notorious that the functions of the minor criminal courts—the courts of summary jurisdiction—have been vastly enlarged in recent years, and the tendency to enlarge their functions still further is constantly going on. As a matter of fact, the number of indictable cases tried summarily vastly outnumber the indictable cases tried at sessions and assizes.

Annual Average, 1890-94.

Indictable offenders tried summarily	56,323
,, ,, at Sessions and Assizes	11,989

The tendency to remove indictable charges from the jurisdiction of the higher courts and to dispose of them by summary proceedings is supplemented by the tendency to exclude many charges which are technically indictable from the indictable list altogether.

When these circumstances are taken into consideration in the interpretation of the figures relating to the fluctuations of crime, it would be rash to assume that these figures represent anything more than a nominal decrease in the proportions of crime to the population: changes in criminal law, changes in judicial procedure, changes in the attitude of the public and the authorities towards offenders and offences, all bear their part in affecting the statistics of crime and in making it exceedingly difficult to say whether there is a greater amount of crime at one period than at another.

I will now say a few words on international criminal statistics. From time to time the value of international criminal statistics has formed the subject of interesting and important papers in the bulletin of the International Statistical Institute. In some of these papers the practicability of instituting comparisons of an international character has been discussed. I am inclined to agree with the report of Dr. Starcke of the German Statistical Bureau, that the attempt to institute such comparisons is at present impracticable. This arises from the circumstance that no two nations classify crime in the same manner. No two nations have the same criminal law or the same methods of criminal administration. Until there is something approaching to similarity in these important respects, a mere confrontation of figures drawn from the criminal

statistics of civilised communities cannot have any satisfactory results in determining the position which each nation holds in the scale of criminality. Although international statistics are not as yet of much use for the purposes of comparative criminality, they are on the other hand of considerable value as an index of the general conditions which tend to produce crime amongst civilised peoples. On looking, for example, at the geographical distribution of crime as it is exhibited in international criminal statistics, we find a close relationship between the ratio of crime and the distribution of the population. In any community where the population is thinly distributed the ratio of crime is lower than where the population is dense. Whether we look at the criminal statistics of Germany or Italy, France or England, we always find that crime is high where population is dense, and comparatively low where population is sparse. International criminal statistics, by widening the basis of comparison, assist us in our attempts to understand the relation which exists between the distribution of population and the volume of crime. International statistics also assist us to understand the relations which exist between age and crime, sex and crime, occupation and crime. In short, the value of international statistics lies in the fact that they shed light on the general conditions which tend to produce the criminal. These statistics do not tell us whether one country is more criminal than another, but they do tell us something about the general causes of crime: and after all it is of vastly more importance to know what the causes of crime are than to know in what community crime is most rampant.

In fact the value not merely of international criminal statistics, but also of national criminal statistics, is to a great extent to be measured by the amount of light they throw on the conditions which produce the criminal population. We shall never be able to diminish crime until we know the conditions which are producing it. It is only by statistical methods that these conditions can be fully ascertained. In a general way these methods have already revealed the fact that criminal conduct is the direct result of the individual condition or the social conditions of the offender, or of both sets of conditions acting in combination. The most important individual condition in determining the nature and intensity of criminal tendencies is sex. International criminal statistics unanimously point to the conclusion that males are more addicted to crime than females. Among individual conditions age comes next in importance to sex in determining the character and amount of crime. On this point international statistics tell the same tale as national statistics. The remaining individual conditions may be summed up as the

physical and mental characteristics of the offender. In recent years a very great deal has been done in the direction of ascertaining what these physical and mental characteristics are. The results of statistical investigation tend to show that there is a much higher ratio of physical and mental degeneracy among the criminal population than among other sections of the community. The inquiries into the physical condition of the criminal population by such men as Lombroso, Marro and Ferri in Italy, by von Baer and others in Germany, by Laurent, Féré and Dallemagne in France and Belgium, all point to the conclusion that criminals exhibit a larger percentage of physical anomalies of a degenerative character than the general population. In England Dr. Warner has instituted inquiries of a somewhat similar character with reference to the industrial school population, and he reaches practically the same conclusions. That there is a relation between crime and physical degeneration may be accepted as an established fact. It remains for criminal statistics in the shape of prison statistics to show the closeness and the extent of this relation. The relation between mental degeneracy and crime is also beginning to be exhibited by statistical methods. Insanity is one of the acutest forms of mental degeneracy. The annual amount of insanity arising in the general population over the age of 15 amounted to 8 per 10,000 in the three years 1890-92, the annual ratio of insanity in local prisons for a similar period amounted to 226 per 10,000. These figures show that there is a close connection between mental infirmity and the tendency to crime.

One of the most pressing tasks of criminal statistics at the present moment is to exhibit the proportions of mental and physical degeneracy in the criminal population under detention. The satisfactory performance of such a task would lead to two important practical results: in the first place it would pave the way for the rational treatment of degenerates under detention in prisons. In the second place it would show the community to what extent individual degeneracy was responsible for crime. If crime is to be diminished it can only be diminished by mitigating the conditions which produce it, and there can be no doubt that individual degeneration is one of these conditions.

Criminal statistics show that crime is a product of social as well as individual conditions. We see a proof of this in the connection between occupation and crime. No doubt the existing materials for estimating the effect of occupation on the tendency to crime are very imperfect. But they help to bring one fact into view: there is a high percentage of unskilled workers in the prison population of England as compared with the percentage

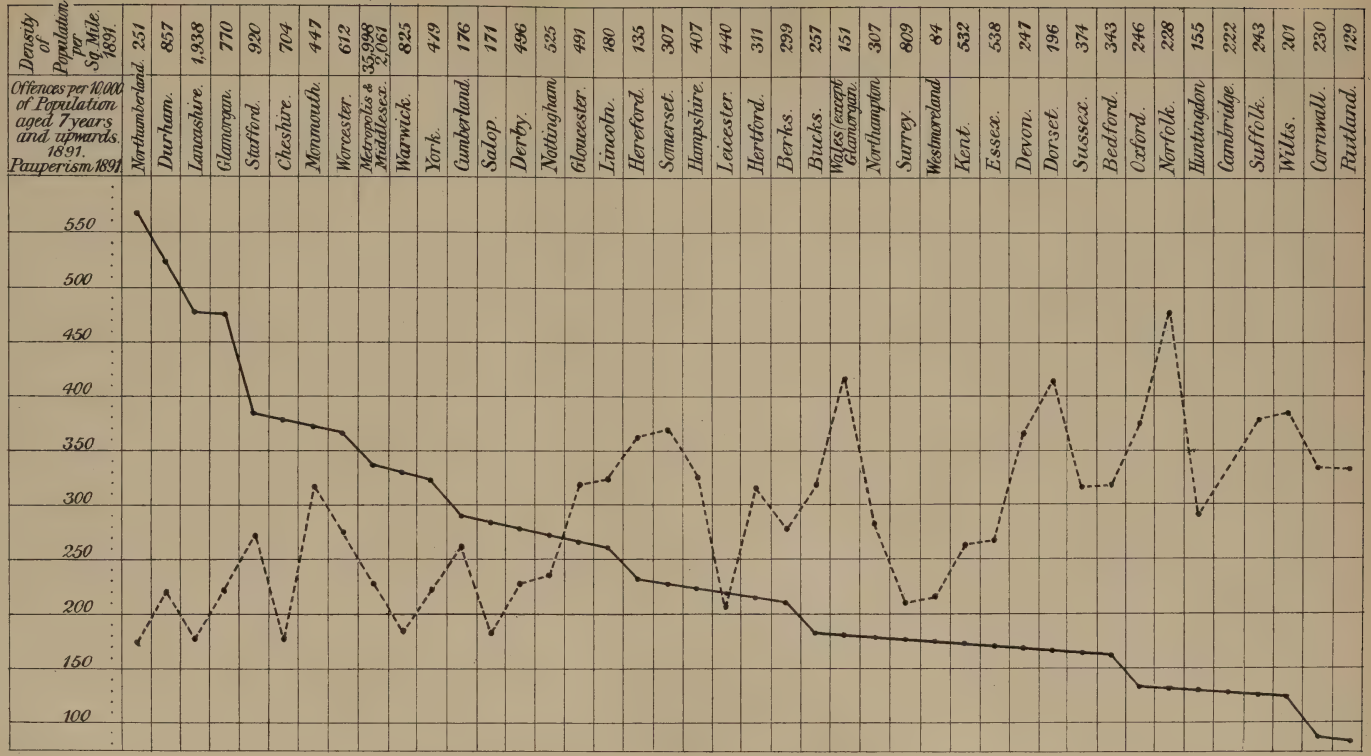
of this class of workers in the general community. In 1893 the percentage of labourers in the prison population amounted to 64·9 per cent. The percentage of labourers in the general population amounts to only 16·6 per cent. These figures must be accepted as the merest approximations, but they offer a sufficient indication of the fact that the lower down we descend in the ranks of industry, the higher we ascend in the proportions of crime. The principal cause of this, no doubt, is that general labourers are recruited as a rule from the most backward, the most impoverished, the least self-respecting class of the community. Moreover the general labourer is also very irregularly employed, and irregularity of employment is a fruitful source of crime.

Another interesting fact in connection with social conditions and crime is that pauperism and crime are not so closely allied as would natuarlly be supposed. When we proceed to compare the local distribution of crime and pauperism in England and Wales we find as a rule that there is least crime where there is most pauperism. I will select a few examples of this condition of things from a book I am about to publish on Juvenile Offenders.

"On the 1st January, 1892, the number of paupers in England "and Wales per 1,000 of the estimated population amounted to "26·2. Below this average for the whole country are the counties "of Lancashire, Cheshire, Northumberland, Warwick, Middlesex, "Durham, and several others. Now it is a remarkable circum-"stance that all the counties which have just been mentioned as "showing a percentage of pauperism below the average, at the "same time exhibit a percentage of juvenile crime, and of crime "in general above the average. On the other hand, if we look at "the counties which are most burdened with pauperism, we find "that a very large proportion of them are counties with a very "small percentage of either juvenile or adult crime. In the "counties of Norfolk, Dorset, North Wales, which contain more "than 40 paupers per 1,000 of the population, there is not half as "much crime of any description as exists in counties containing "less than 20 paupers per 1,000 of the population. The county "which shows the lowest percentage of pauperism is Lancashire, "but it is nevertheless one of the districts which has the highest "ratio of juvenile crime. The county of Norfolk has the largest "number of paupers per 1,000 of the population, but it has a "comparatively small amount of juvenile and adult offenders.

"What are the most probable causes of this remarkable dis-"parity between the ratio of pauperism and the ratio of crime? "In addition to the causes already noted as producing a high rate "of crime in large centres of population, the method of adminis-"tering the poor law requires to be mentioned. In order to

RELATION BETWEEN OFFENCES (TRIALS) AND PAUPERISM (OUTDOOR AND INDOOR).



Offences ——— *Pauperism* ----------

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" prevent wholesale imposture the guardians of the poor in our " densely populated districts are obliged to administer the law to " a greater or less extent on certain hard and fast principles. It " is almost impossible for them to know the real antecedents " of a large proportion of the applications for relief, and one " of the inevitable results of this lack of accurate information " respecting the cases which come before them is that applications " for poor law relief are, as a rule, dealt with more rigidly in towns " than in the country. It is therefore probable that the refusal of " assistance, or the knowledge that assistance will be refused if " applied for, while it has the effect of reducing the numbers on " the poor rate in our large cities, has also the effect of swelling " the proportions of crime in them. In the country districts, on " the other hand, the poor law is administered by persons possess- " ing an intimate knowledge of the real economic circumstances " and antecedents of almost all applicants for assistance. These " applicants, unlike the city poor, are not a floating population " which are here to-day and somewhere else to-morrow; they " are not composed of people for the most part without a " history or a settled home. Almost all of them have resided from " childhood upwards in the same village or the same neighbour- " hood. It is easy to trace their previous history, and to acquire " an accurate knowledge of their character, their habits and the " most important vicissitudes in their humble career. It would " appear that this intimate and minute acquaintance with all " the details and circumstances of each case is of considerable " importance in connection with poor-law administration— " in fact, it is probably a partial explanation of the differ- " ence in the ratio of pauperism in the agricultural districts " as compared with commercial and industrial centres. Inasmuch " as it leaves the greater poverty of the agricultural labourer out " of account, as well as his immemorial attitude towards the poor " law, this explanation is obviously of a partial character; " nevertheless it counts for something; and, as far as crime is " concerned, the more general distribution of poor-law relief in " the country than in the towns is undoubtedly to be reckoned as " one among the many reasons why the country population is less " criminally disposed than the urban population.

" It is not, however, to be supposed that a more rigid adminis- " tration of the poor-law system in the country districts will have " the effect of raising the rate of crime to the same high level as " exists in towns. If crime were merely a product of poverty this " would no doubt be the case, but it is a well ascertained fact that " a multitude of offences against the criminal law are not the " result of economic causes. Innate disposition, parental example,

" social surroundings, social habits, the presence of temptation " and opportunity, all play a more or less prominent part in " determining the extent and intensity of crime. Several of these " causes operate much more powerfully in the towns than in the " country. As far as the amount of crime is concerned there is " accordingly every reason to believe that densely populated " centres will always be at a disadvantage as compared with thinly " peopled districts. Offences against the person, for instance, are " very seldom the direct result of economic causes. Owing to the " extensive opportunities for contact and conflict arising out of " the existence of a highly concentrated population, offences of " this character are more numerous in towns, in proportion to the " inhabitants, than in the country. It is the same with drunken- " ness. The opportunities for becoming intoxicated are much " greater in towns than in the country, inasmuch as the public " house is almost always closer at hand. Offences against property " stand upon a somewhat similar footing. The opportunity of " committing such offences, and therefore the temptation to " commit them, is always greater in towns; the consequence is " that a larger number are committed by the town populations. " These examples are sufficient to demonstrate that an equalisation " of the economic conditions of existence as between town and " country would not necessarily be followed by a corresponding " equalisation of the ratio of crime."

Whilst the relation between pauperism and crime is not so close as might naturally be supposed, it must on the other hand be recollected that there is an intimate relation between economic vicissitude and crimes against property. The ups and downs of trade are reflected in criminal statistics. Periods of economic prosperity are periods in which offences against the person have a tendency to increase. Periods of economic adversity are periods in which offences against property exhibit a tendency to rise. I will venture to state the relations between economic conditions and crime in the following terms: other things being equal, districts where the standard of life is low, but which are comparatively free from extreme economic vicissitudes, will be less criminal than districts where the standard of life is higher, but where the population is from time to time exposed to violent economic ups and downs. It would be impossible for me within the compass of this paper to enlarge upon the variety of social conditions which tend to produce crime. Among these conditions may be mentioned social habits, such as the habit of carrying arms, social convulsions, such as wars and political uprisings, social institutions, such as militarism. Enough however has been said to show that crime is the result of individual and social conditions, mostly of an adverse

character. These conditions sometimes act singly, but more often in combination. Penal law and penal administration, no matter how rigorous they may be made, do nothing to alter these adverse conditions. It is for this reason that merely punitive agencies are so helpless in the contest with crime. In that contest the only effective agencies are agencies of an ameliorative character. Crime will diminish in proportion to the progress of individual and social amelioration. Progress of this character removes the causes from which crime proceeds. *Cessante causa, cessat effectus.*

APPENDIX.

I.—*Statement showing the Number of Prisoners of Both Sexes in Local and Convict Prisons, during the Seventeen Years following.*

Year.	Population.	Remarks.
Year ending 31st March, 1880....	30,134	
,, ,, '81....	28,324	
,, ,, '82....	28,043	
,, ,, '83....	28,068	
,, ,, '84....	27,140	
,, ,, '85....	25,866	
,, ,, '86....	23,714	
,, ,, '87....	22,539	
,, ,, '88....	21,799	
,, ,, '89....	21,250	
,, ,, '90....	19,748	
,, ,, '91....	18,365	
,, ,, '92....	17,425	
,, ,, '93....	17,653	
,, ,, '94....	18,233	
,, ,, '95....	17,752	
,, ,, '96....	17,614	

II.—*Table of Sentences passed at Assizes and Quarter Sessions in* 1883 *and* 1893.

	Number.		Proportion per 1,000 Convictions.	
	1883.	1893.	1883.	1893.
Death	23	28	2·03	2·89
Penal servitude—				
Above 15 years	38	7	3·35	0·72
15 years and more than 10....	28	24	2·47	2·48
10 ,, ,, 5....	427	161	37·63	16·61
5 ,, under	885	768	77·99	79·24
Total penal servitude	1,378	960	121·45	99·05
Imprisonment—				
Above 1 year	1,318	789	116·15	81·41
1 year and above 6 months....	3,010	1,933	265·27	199·44
6 months and above 3 months	2,805	2,260	247·20	233·18
3 ,, ,, 1 month	1,545	1,675	136·16	172·82
1 month and under	777	1,118	68·48	115·35
Total imprisonment	9,455	7,775	833·26	802·20
Detention in reformatory	160	61	14·10	6·29
Fine, whipping, and recognizances	331	868	29·17	89·57
Total	11,347	9,692	1,000·00	1,000·00

III.—*Number of Persons Tried for Indictable Offences,* 1874 *to* 1894.*

Nature of Offences.	Annual Average for each Period of Five Years.				Total for 1894.
	1874-78.	1879-83.	1884-88.	1889-93.	
CLASS I.					
Crimes of violence	1,829	1,582	1,581	1,505	1,473
Sexual crimes	691	750	1,291	1,150	1,187
Total of Class I	2,520	2,332	2,732	2,585	2,660
CLASS II.					
Burglary, &c.	1,092	1,517	1,545	1,589	1,813
Robbery	328	317	342	294	333
Total of Class II	1,420	1,834	1,887	1,883	2,146
CLASS III.					
Larcenies, &c.	46,999	53,297	50,207	49,988	49,305
Frauds	901	1,128	1,060	972	1,158
Total of Class III	47,900	54,425	51,267	50,960	50,463
CLASS IV.					
Malicious injuries to property	202	254	277	270	209
CLASS V.					
Forgery	180	223	204	195	230
Coining	220	300	306	151	125
Total of Class V	400	523	510	346	355
CLASS VI.					
Miscellaneous offences	602	712	710	568	448
Grand total	53,044	60,080	57,383	56,612	56,281

* This table includes all persons for trial at assizes and quarter sessions as in Table A and Tables I to V, and all persons tried summarily for indictable ffences as in section (*a*) of Tables B and XI. See "Criminal Statistics, 1893."

IV.—*Proportion of Indictable Offenders tried to Population.*

Nature of Offences.	Proportion per 100,000 Population.				
	1874-78.	1879-83.	1884-88.	1889-93.	1894.
CLASS I.					
Crimes of violence	7·50	6·07	5·74	5·17	4·90
Sexual crimes	2·84	2·88	4·69	3·96	3·95
Total of Class I	10·34	8·95	9·93	8·89	8·85
CLASS II.					
Burglary, &c.	4·48	5·82	5·62	5·47	6·03
Robbery	1·34	1·22	1·24	1·01	1·11
Total of Class II	5·82	7·04	6·86	6·48	7·14
CLASS III.					
Larcenies, &c.	192·85	204·63	182·42	171·88	164·02
Frauds	3·70	4·33	3·85	3·34	3·85
Total of Class III	196·55	208·96	186·27	175·22	167·87
CLASS IV.					
Malicious injuries to property	0·83	0·98	1·01	0·93	0·69
CLASS V.					
Forgery	0·74	0·85	0·74	0·67	0·76
Coining	0·90	1·16	1·11	0·52	0·42
Total of Class V	1·64	2·01	1·85	1·19	1·18
CLASS VI.					
Miscellaneous offences	2·47	2·73	2·58	1·95	1·49
Grand Total	217·65	230·67	208·50	194·66	187·22

V.—*International relation between Sex and Crime.*

	England, 1893.	Germany, 1882-92.	Austria, 1891.	France, 1886-90.	Sweden, 1888-92.	Norway, 1861-85.	Denmark, 1881-90.	Spain, 1883-85.	Mexico, 1881-83	Japan, 1886-91.
Males	82·0	81·9	84·8	85·0	84·6	79·1	73·6	89·0	85·8	91·3
Females	18·0	18·1	15·2	15·0	13·6	20·9	26·4	11·0	14·2	8·7

Discussion *on the* Rev. W. D. Morrison's Paper.

The President (Mr. John B. Martin) said that it had been announced that the chair would be taken by Mr. Macdonell, Vice-President, and he would now retire in his favour, as he was unable to remain during the discussion. But he should like to thank Mr. Morrison for his paper first, because of the wide view he had taken of the subject generally, and next because he had shown very clearly in dealing with this question how true it was that mere figures, whether official or otherwise, were not statistics. They were the raw material for statistics. Among other forces which had to be taken into consideration in dealing with statistics of crime, the author had instanced the question of the activity of the police and the view taken by them with regard to crime. On that point he was reminded of a statement made a year or two ago in a similar discussion, when it was suggested that if the population of Bournemouth were made equal to that of Glasgow, and the respective police forces interchanged, the result would be that on a Saturday night no cases of drunkenness would be reported in Bournemouth, whilst in Glasgow the whole population would be under lock and key.

Mr. J. Macdonell, LL.D., having taken the chair, expressed the great pleasure which, he was sure, was felt by all present in seeing the President again amongst them after his recent severe illness, and his regret that he (the President) was not yet strong enough to remain until the end of the discussion.

Sir Francis S. Powell, Bart., M.P., thought it was of very great importance that the necessarily dry statistics of great departments should be considered from time to time by those who examined figures from a different point of view, and who could dissect them in a manner which the department could not. Reference had been made to the diminution of sentences not being a proof of the diminution of crime; but it might be remarked that the diminution of sentences had arisen not only from a change of public feeling and increase of sympathy and consideration for the weaker brethren, but also from a feeling that crime had diminished, and that, therefore, there was not the same necessity for sharp punishment as a deterrent. There could be no doubt that judges and justices of the peace had diminished sentences, because they believed that there was now greater order in society than formerly, and that property was in greater security. The observation made with regard to the amount of crime which was not detected was especially interesting. If it escaped detection, and consequently conviction, that made an error on one side; but there were also counterbalancing errors on the other side. Perhaps in

the reference made to the police reports for Manchester, the writer had in his mind the suggestive remark made by the police of that city on one occasion, when they referred to the number of what he might describe as educated crimes which escaped detection—cases where one relation being a trustee robbed another, and where, to avoid disgrace, nothing was said. At the same time much of that crime ceased to be crime except in a technical sense, because the default of one year was often compensated for by the replacement of the money in a succeeding year. The remarks made as to the connection between crime and physique were, he believed, thoroughly accurate. He had had the misfortune and the honour of being visiting justice for some years, and nothing struck him so much when visiting the gaols of Yorkshire, as the physical degeneracy of many of the prisoners. There is no doubt great truth in what one chairman of quarter sessions once said to him, "You may depend upon it, very few persons live by crime who can live by anything else." First there was the want of mental power, which prevented a man from obtaining a livelihood in the usual manner, and in the next place a want of physical strength which rendered it difficult for him, even if willing, to pursue an honest avocation.

Mr. John Glover, J.P., said that the main usefulness of the paper was in directing attention, as stated in the title, to the interpretation of statistics and the methods to be followed in dealing with statistical materials. The business of the statistician was strictly to deduce proper lessons from statistics of any kind. Mr. Morrison had marshalled the various qualifications which affected the statistics admirably, and showed with force how many factors there were. But he (Mr. Glover) was struck at the same time with the consideration that these disturbing forces alluded to in the paper were nearly always present and tended to counterbalance each other. For this reason their presence ought not to be taken too much into account. He would refer to one statement on p. 12, that "Broadly speaking, these returns showed that there had been no decrease in the most serious kinds of crime within the last ten years." He read that with great regret, though he was inclined to think that Mr. Morrison was right. It was very sad to think that with the innumerable ameliorating agencies of every description which were at work, especially those of education, up to the present we had not succeeded in diminishing the more serious forms of crime. Then the paper went on to state, "The contention that sentences had been shortened because the gravity of crime had decreased, had no foundation in fact." He would like to ask whether the sentences had really been shortened to quite the degree mentioned? So far as his observation had gone, there were two tendencies now at work: sentences for the lighter class of offences were certainly milder, and there was greater reluctance to send young persons to prison. But he was also under the impression that when the courts of justice dealt with offenders who had been repeatedly convicted, there was a growing tendency to give longer sentences, sometimes thought

to be out of proportion to the actual offence. The other statement that habitual offenders were increasing, and that the same men kept constantly coming back to prison was, he feared, also true. The governor of a convict prison had once told him that there was little of a remedial character in the prison discipline, or at all events it had not that effect, for he found that so many of the men came back again. The lesson Mr. Morrison had read, that they could only hope to diminish crime by mitigating the conditions which produced it, seemed to be the true moral of all the figures. Not until they got a larger proportion of the people well employed and into better social conditions, as well as better educated, could they hope to amend this sad state of affairs.

Mr. Noel Humphreys regretted the very pessimistic tone which pervaded this useful and interesting paper, and almost ventured to believe that the author had rather exaggerated the tendency of some of the figures to which he referred. All were agreed that it would be preposterous to assume that the recent marked decline in the prison population indicated an equivalent reduction in crime, but he believed that on the appearance of the last Census Report, Mr. Morrison had even taken exception to the very moderate expression of opinion that the judicial statistics did not afford the means for determining whether the reduction of sentences was a full and sufficient explanation of the decrease of prison population. In connection with this decrease of prison population, it had been pointed out that it was the deliberate opinion of the police authorities throughout the country that the criminal classes had decreased within the last ten years. If this opinion was founded on a sound basis, it would appear to show that the reduction of the prison population was, at any rate partly, due to a decrease of crime. The author showed throughout the paper a marked disinclination to accept any statistics suggestive of social improvement, and in referring to the very large recent reduction in the convictions for drunkenness, he pointed out quite truly that the Registrar-General had called attention to an increase of deaths attributed directly to intemperance in recent years. He could not himself attach very much importance to this fact as a set-off against the remarkable decline in the number of convictions for drunkenness. There was much hesitancy on the part of medical practitioners to attribute deaths directly to intemperance, and therefore the number of cases so returned bore no relation to the actual facts, and any slight recent increase was probably due to more accurate returns, more especially as there had been in most years a really remarkable decline in the deaths referred to those diseases of the liver which resulted from the excessive use of alcohol. He could not see from the tables at the end of the paper that the statement that serious crimes had increased in recent years was really borne out. In Table IV, Class I included crimes of violence and sexual crimes, and Class II included burglary and robbery, which might safely be put down as serious, but the proportion to population in 1874-78 of these two classes was 16·16 per 100,000, and declined

to 15·37 in 1889-93. How then did Mr. Morrison arrive at his unfortunate conclusion? Again, it is stated that the only class of indictable offences which had increased faster than the growth of population were sexual offences and robberies with violence. In the same table these headings (Class I) showed a decline from 10·34 in 1889 to 8·89 in 1889-93. He doubted, moreover, whether Mr. Morrison's paper contained any conclusive evidence in support of his depressing conclusion that habitual criminals were increasing.

Mr. C. DE BROË said there were one or two points in the paper which appeared to him to be in contradiction to one another. In the first place, the author said that in proportion to the increase of population in recent years there had been an actual increase in crime, or at any rate in crime of a serious character. At the same time he admitted that more humane sentiments had prevailed of late, and that a less rigorous application of the penal code had been in force, while they all knew that many ameliorative agencies had been at work. These favourable circumstances however, according to Mr. Morrison, had not led to a diminution of crime. Yet at the conclusion of the paper he said that merely punitive agencies were helpless in the contest with crime, and that reliance could only be placed on ameliorative agencies. There would seem to be a *non-sequitur* here; for if Mr. Morrison's contention were correct that crime had increased under the admitted circumstances, then it would surely follow that the relaxations in the penal law and the more tender treatment of the criminal population were far from having led in the past to the beneficial results claimed for their future extension.

Mr. E. W. BRABROOK supported the conclusion drawn by the author with regard to the close connection there was between physique and the criminal instinct. The provisions for the identification of criminals under Dr. Garson would undoubtedly result in the collection of a vast amount of information with regard to their physical characteristics. He welcomed any disposition to shorten sentences, as showing a growing tendency to look upon crime more as a disease to be cured than an offence to be punished. If it was a fact that robberies with violence had increased of late years, that was a strong point in favour of the reduction of severity of punishment, because in connection with this offence flogging was still maintained, though it did not act as a deterrent. He was much struck by the statement that out of 589,000 convictions, only 172,000 were committed to prison, and presumed that the meaning of that was that the other sentences were fines or some penalty other than imprisonment, and therefore included a vast number of cases which were not strictly criminal at all, but which were referred to elsewhere as cases of mere contravention. Mr. Morrison would doubtless find that the number of offences of this nature had immensely increased by the legislation of the last few years, and that ought to be taken into consideration in measuring the increase or decrease of crime.

Mr. A. E. Bateman, C.M.G., was struck by the statement that the percentage of *labourers* in the prison population was 64·9, whilst in the general population it was only 16·6. He should like to know whether that percentage of the general population was taken on the corrected population, or whether the 16·6 per cent. was based on a total population which included all the babes and sucklings they had heard of, who certainly could not yet be classed as possible labourers. The author had rightly called attention to the fallacy of deducing any facts from population figures which took in the very earliest ages; and this certainly was a case in which they would get a wrong figure if the earlier ages were not rejected. He wished to compliment the author upon the excellent literary style of the paper.

The Chairman (Mr. J. Macdonell) said it was very difficult to compile statistics, more difficult to arrange them, and still more difficult to interpret them; and he thought Mr. Morrison had done good service by putting people, whose duty it was to compile criminal statistics, on their guard against certain common fallacies in construing their meaning. Grave doubts had, however, risen in his mind with regard to some of the conclusions arrived at in the paper. Mr. Morrison laid great stress on the large number of indictable offences, but they formed only a portion of the vast region of crime. There was a still larger proportion of smaller offences, statutory misdemeanours, police offences, &c., and unfortunately the divisions between the two great regions was drawn in a most arbitrary way. The only proper mode of looking at crime was to regard it as a whole; and it would then be discovered that there were difficulties to which Mr. Morrison had not referred, or only very faintly, and that the entire figures, when examined, pointed to conclusions somewhat different from those at which Mr. Morrison had arrived. On p. 2 of the paper he gave figures as to the approximate number of convictions in England and Wales for 1892. He (Mr. Macdonell) had jotted down the corresponding figures for 1894, and they amounted to 553,442. Of that total he found that no fewer than 6,000 were offences under the Education Act, more than 19,000 obstructions to the highway, &c.; the violation of police regulations amounted to 64,000, begging to more than 10,000, and drunkenness to nearly 160,000. These slight offences amounted altogether to over 323,000, or more than 60 per cent. of the whole number; and he believed he was not straining facts when he said that a large proportion of them were, in any but a technical sense, not really crimes. Under some systems of law they were not so treated; under our own law until recently they were not so designated. It was an accident whether or not in a few years hence some of the so-called offences would be classified as matters to be dealt with by the civil or the criminal law. To answer properly the question described in the paper, the vague entity, "crime" must be broken up into its component parts, and when this was done some of the figures would be found to relate to offences, if they could be justly called such, implying no moral depravity on the part of those

who committed them. A second qualification, already referred to in the discussion, ought to be pressed still more strongly than it had been. Every year the number of statutory offences was increased; and over against the figures on which Mr. Morrison had laid stress, must be put the fact that the possibility of committing offences had been very greatly increased. A third qualification referred to briefly by Mr. Morrison, and also by Mr. Glover, was that in the case of the most serious crimes really indicative of more or less wickedness—crimes of violence, larceny, and malicious injury to property—there had been a remarkable diminution. Mr. Morrison had referred to the fact—and no doubt it was a fact—that prison statistics afforded no accurate indication of the increase or decrease of crime. But he had not referred to another aspect of the matter, viz., that the habitual criminal, who in former years was kept in durance for long periods, and thus prevented from committing fresh crimes, was under the present system let out of prison, and probably came back after having committed two or three crimes, all duly noted by the police, inserted in the returns, and contributing to the totals mentioned in Mr. Morrison's paper. Mr. Morrison had passed over too lightly some facts which pointed to a more favourable conclusion with regard to the progress of society than that stated in the paper; and he (Mr. Macdonell) ventured to say that the more hopeful conclusion was in accordance with the impressions formed by the great majority of those who had to administer the criminal law. Two deplorable facts, however, had been clearly established by this paper: the first was that there was a marked increase in crime of all kinds by persons between the ages of 16 and 21, and any doubts that might be felt as to this point might be removed by the circumstance that the same phenomenon appeared with equal clearness in the criminal statistics of almost every European country. A second point had also been established—the undoubted increase of habitual offenders. The interesting questions mentioned at the end of the paper could only be solved by figures, which at present did not exist, and it seemed to him that the time had come for a great extension of criminal statistics beyond the old boundary lines. There were, and always had been, two schools on this subject—one represented by Lombroso, who insisted strongly on the fact that the true criminal was born such, with certain marked physical characteristics; the other school dwelt on the fact, as he thought rightly, that to a large extent crime and the criminal were the products of circumstances, which could often be modified by a trifling expenditure of forethought. How much crime was due to external influence was illustrated by facts verified by all European statistics, that most suicides took place at certain seasons of the year, increasing in the height of summer and decreasing in the depth of winter. He ventured to suggest to Mr. Morrison, as an interesting subject for further investigation, this external of weather as an agent in the production of crime.

Rev. W. D. Morrison in reply said he had to thank his critics for their interesting remarks, but it was quite impossible to go over all the points raised. Mr. Humphreys said that the police reports all pointed to the fact that the criminal classes were diminishing, but if he would look at the criminal statistics, the revised issue, he would find in the introduction that those police reports as to the number of criminals at large were stated to be practically useless; the police officials who were before the committee admitted that they were mere guesses of no real value. Again, he would find that the committee were of opinion that it might have been as well to miss out the police statistics altogether. In 1874 the proportion of sexual crimes to the population was 2·84 per 100,000; in 1884 the same offences had risen to 3·95 per 100,000 Again, taking Class II, burglary, the amount was 4·48 in 1874-78, and 6·3 in 1894. He had expressly called attention to the fact that although the total amount of crime had risen from 53,000 in 1874-78 to 58,000 in 1894, yet the rise had not been quite equivalent to the growth of population; but he also pointed out that there was an increased reluctance on the part of the public to prosecute, which, to a certain extent, explained why the increase in the number of offenders had not quite kept pace with the growth in the population. With regard to the increase of ameliorative agencies and the concurrent increase of crime, he contended that there were certain adverse conditions continually cropping up which neutralised the effect of the ameliorative agencies. Take, for example, the amount of degeneracy and homelessness which resulted from the growth of large cities alone. Take the number of boys who were cast adrift in London at 14 to 16 years of age because the fathers and mothers had no house room for them. Over and over again he saw children coming to prison, and when he asked why, they said they had been turned out of their homes because of the growth of the family, not because the father was not able to pay a considerable rent for his lodging, but because of the condition of house accommodation in London. The step from the pavement to the prison cell in the case of such children was easily taken. He cordially agreed with Sir Francis Powell's remarks as to the physical and mental condition of the criminal population, a considerable proportion of which were certainly not adapted to earn a living in society as it existed at present. It was most important, as Sir Francis Powell had pointed out, that the conditions under which children and young people had to live should be so ameliorated that they would be able, both from a physical and mental point of view, to earn their living under normal industrial conditions. If they could only alter the social conditions under which vast masses of the population had to live, they would at the same time succeed in ultimately raising their physical condition. His own opinion was that there was an intimate correlation between individual and social conditions. The proper way was to ameliorate the individual and social conditions of the population concurrently, and thus remove the causes which tended to produce crime. In one of the tables it would be seen that the relation between pauperism and crime was a relation

which, so far as it existed, did not lie on the surface. An examination of this table would show that as a rule there was least pauperism where there was most crime, and least crime where there was most pauperism. Counties where poor-law relief was highest had, as a rule, the smallest proportion of criminals to the population. Counties, on the other hand, where poor-law relief was lowest had, as a rule, the highest proportion of criminals to the population. This was an interesting fact which so far had not been accounted for. Could it be accounted for on the ground that a high ratio of poor-law relief to the population diminished the temptation to crime by supplying the elementary wants of existence to the potential criminal? Or could it be accounted for on the ground that the ratio of crime was mainly governed by the distribution of population? In other words, had we a high rate of crime where population was dense as in the towns, and a low rate where it was sparse as in the country? Both explanations were partly true, and supplemented each other. In short, a too rigid system of poor law administration would increase crime, and the growing tendency to herd in towns would also increase it, unless great ameliorations took place in the physical and economic conditions of existence.

Local Death-Rates *in* England *and* Wales *in the* Ten Years 1881-90. *By* Thomas A. Welton.

[Read before the Royal Statistical Society, 19th January, 1897.
Dr. G. B. Longstaff, in the Chair.]

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I propose, in the following paper, to establish as a fact that between the age 5 and 45, and particularly between the age 15 and 35, such an impression is made upon death-rates by migrations and by casual events, that for the purpose of measuring the strength of the forces operating for and against life, the facts at those ages should be left out of account, and our attention should be concentrated upon the statistics as to ages 0—5 and 45 upwards.

Having dealt with that subject, I propose to make a general examination of our mortuary statistics at ages 0—5 and 45—75, so as to show more clearly than is done in the recently published "Supplement to the Fifty-fifth Annual Report of the Registrar-"General," what is the range of mortality in England and Wales, and what districts may justly be regarded as being healthy.

I.—*As to Disturbances of the Death-Rates by reason of Migrations, &c.*

It is now many years since I read before the Institute of Actuaries a paper on this subject, which appeared in their Transactions, and a copy of which was sent by me to Dr. Ogle, of the Registration Office. My task on the present occasion is mainly to apply the ideas I then promulgated to the facts furnished by Dr. Tatham in the Supplement referred to.

In any similar analysis I think it is essential that there should be carefully distinguished :—

1. The chief cities.
2. Sufficient specimens of smaller places, for instance :—
   - Old cities.
   - Dockyard towns.
   - Other towns.

3. The seaside and inland places, resorted to for pleasure and health.

4. Anv extensive densely peopled areas.

5. The remaining districts territorially divided.

It will happen, of course, that the places specially shown must either include many examples not strictly to the purpose (places, for instance, where a town is conjoined with an extensive rural district), or if not, that many places which might come under the second category will be included under the fifth. I have preferred to adopt the latter alternative.

In every case where the facts for a large town are shown, I have embraced within the boundary selected almost the whole place, if not the entirety, and in the case of the metropolis this principle brings in so much of Middlesex that I have thrown in the small remainder too.

The final classification I have adopted is as follows:—

1. London (registration county), Middlesex (registration county), and the districts of West Ham, Romford, Bromley, Dartford, Croydon, Kingston, and Richmond.

2. Liverpool, with the districts of Toxteth Park, West Derby, and Birkenhead.

3. Manchester, with the districts of Salford, Chorlton, and Prestwich.

4. Birmingham, with Aston and Kings' Norton districts.

5. Leeds, with Hunslet, Holbeck, and Bramley.

6. Sheffield, with Ecclesall Bierlow.

7. Bristol, with Barton Regis and Bedminster.

8. Hull, with Sculcoates.

9. Newcastle-on-Tyne, with Gateshead.

10. Nottingham, with Basford.

The above places include sixty-nine registration districts.

11. Old cities, viz.:—Norwich, York, Chester, Carlisle, Worcester, Exeter, Canterbury, and Chichester.

12. Dockyard towns, viz.:—Portsmouth (including Portsea Island and Alverstoke), Plymouth (with East Stonehouse and Stoke Damerel), and Chatham (Medway district).

13. Twelve towns, viz.:—Leicester, Southampton (with South Stoneham), Derby, Northampton, Reading, Ipswich, Coventry, Maidstone, Yarmouth, Cambridge, Colchester, and Oxford.

Under these heads twenty-seven districts are placed.

14. Brighton (with Steyning), Hastings, Eastbourne, Worthing (East Preston district), Thanet, Isle of Wight, Bournemouth (Christchurch district), Torquay (Newton Abbot district), Ilfracombe (Barnstaple district), Weston-super-Mare (Axbridge district), Aberystwith, Llandudno (Conway district), and Scarborough.

15. Bath, Cheltenham, Leamington (Warwick district), and Tunbridge (including Tunbridge Wells).

These pleasure places include eighteen districts.

16. The Black Country (including the districts of Wolverhampton, Walsall, West Bromwich, Dudley, and Stourbridge).

17. The northern colliery district (including Stockton, Hartlepool, Auckland, Lanchester, Durham, Easington, Houghton-le-Spring, Chester-le-Street, Sunderland, South Shields, and Tynemouth).

18. The Yorkshire manufacturing districts (Keighley, Todmorden, Saddleworth, Huddersfield, Halifax, Bradford, Dewsbury, Wakefield, Pontefract, Barnsley, Rotherham, and Doncaster, and (at a distance) Middlesbro'.

19. The Lancashire manufacturing districts (Preston, Chorley, Blackburn, Burnley, Haslingden, Rochdale, Oldham, Ashton-under-Lyne, Barton-on-Irwell, Bury, Bolton, Leigh, Warrington, Wigan, Prescot, Runcorn, Stockport, Macclesfield, and Hayfield), extending into Cheshire and Derbyshire.

20. The district of Barrow-in-Furness.

21. The South Wales colliery district (Abergavenny, Bedwelty, Pontypool, Newport, Cardiff, Pontypridd, Merthyr Tydfil, Crickhowell, Bridgend, Neath, and Swansea).

22. The Cornish mining districts (Liskeard, St. Austell, Truro, Helston, Redruth, and Penzance).

23. The Staffordshire potteries (Wolstanton and Stoke-upon-Trent).

These populous places comprehend sixty-eight districts.

24. The residue of the counties as under:—

	Districts.
a. Northumberland, Durham, Cumberland, and Westmorland	24
b. Yorkshire	36
c. Lancashire, Cheshire, and Derbyshire	18
d. Wales, with Monmouth, Hereford, and Salop	61
e. Stafford, Warwick, and Worcester	28
f. Leicester, Nottingham, Lincoln, and Rutland	32
g. Gloucester, Somerset, Wilts, and Dorset	56
h. Devon and Cornwall	22
i. Norfolk, Suffolk, and Cambridge	44
k. Northampton, Huntingdon, and Bedford	20
l. Bucks, Oxford, and Berks	26
m. Herts and Essex	23
n. Kent and Surrey	27
o. Sussex and Hants	33

Making in all 450 districts, which, with those previously mentioned, complete the total of 632 districts.

Table I annexed shows the average mortality amongst males

and females respectively in each of the twenty-three groups and in the sub-divisions of the last or twenty-fourth group, at the ages 0—5, 5—15, 15—25, 25—35, 35—45, 45—55, 55—65, and 65—75, for the ten years 1881-90.[1]

The averages for England and Wales at these ages are as follows, viz. :—

Age.	Deaths per 1,000 Living.	
	Males.	Females.
0— 5	61·69	51·99
5—15	4·18	4·22
15—25	4·95	4·94
25—35	7·73	7·34
35—45	12·35	10·55
45—55	19·28	15·04
55—65	34·66	28·40
65—75	70·17	60·08

For the purpose immediately in view I assume that these ratios represent something near the *proportionate* death-rate at the several ages; so that if at the ages to which I have already referred the death-rates in London and other places attracting workers are depressed (relatively) and those in the districts supplying the bulk of such workers are simultaneously raised above the national proportion, I shall take leave to say that my case is made out.[2]

Beginning with the female sex, who in my view are more likely to be strongly affected by the migrations alluded to than males at the same ages, I present in Table II sets of ratios representing local rates of mortality, if national rates are assumed to equal 100 at each age.

[1] I have not distinguished the ages under 25 in quinquennial periods, as this addition to the details shown would hardly have added to the value of the paper.

[2] It has been suggested that the cream of the rural population come to London, and those who remain are the comparatively low class, both in stamina and intelligence. I am willing to admit that the introduction of young people from the country improves the metropolitan average status as to health at ages 15—35, but not to a very great extent. Those who have sympathetic relations with poor families in the country will, I think, agree that to a young person coming from a torpid village, the turmoil and excitement, the hardships and trials, the temptations, even, of a life in London, are apt to do harm. Those who remain at home are perhaps not the most intelligent, but were voluntary effort enlisted in an inquiry as to the *present condition* of persons of both sexes enumerated in 1881 in villages at ages 14—17, it would, I believe, be found that a larger ratio of those who left their village will have died than of those who stayed at home. The point is rendered clearer by the undoubted fact that those who remain in country parishes are almost universally more healthy lives at ages 45 to 75 than those who live in towns.

[This note was added by the author subsequently to the reading of the paper.—ED. *S.J.*].

The first five lines in Table II refer to London and other places, where the mortality at age 15—25 does not exceed 87·6 per cent. of the national rate. It will be seen that in the fourteen country districts the mortality varies from 90·7 to 122·7 per cent. of the national rate, and therefore may be deemed universally higher than that prevailing in the metropolis and other places coupled with it.

In London the rate at age 0—5 is 113·5 per cent. of the national rate, the proportion falls by steps to 78·1 per cent. at age 15—25, and rises afterwards, also by steps, to 108·3 per cent. at age 45—55. In Birmingham there is a similar progressive fall and rise. In Bristol the general course is similar, but the lowest ratio is at age 25—35.

With reference to the pleasure and health resorts, the phenomena appear to be quite different; but here special considerations come in. It seems to me that but for the existence of a very large female working population the rates of mortality for females would be much higher than those shown, approximating more nearly to the rates of mortality amongst males. How numerous they are may be thus shown :—

	Population Age 15—25. Females to 100 Males.
Sea side pleasure places	141·8
Inland „	145·3
London	117·7
Bristol	125·5
Birmingham	111·5

Whilst therefore I think the figures of female mortality in watering places would be considerably higher but for the effect of the departure of working women in case of illness, I am not blind to the fatal defect of the census figures in relation to such places. Their populations are counted when visitors are few, but would be extremely modified if again counted at the height of the season. Some medium between the two points would more justly represent the average, and the mortality, compared with a true average, would appear much lower.

In the second rank I have set down six places, whereof Manchester, Liverpool, Leeds and Sheffield are all more unhealthy than London at all ages. Nottingham and Hull are much less healthy than London at age 15—35. In each place, except Nottingham, the proportionate mortality is lowest at age 15—25.

The third place is given to certain averages derived from eight old cities, three dockyard towns and twelve other towns of the third magnitude (or smaller), also Newcastle-on-Tyne. In none of these cases is there any striking analogy to that of London, the

nearest being that of the twelve towns, where mortality, as in London, is lowest at age 5—45.

Then follow the figures for certain dense working populations, amongst which perhaps the most striking are those for the "Black Country" in South Staffordshire. Although in that unattractive neighbourhood females at age 15—25 are less numerous than males, female mortality is comparatively low at age 5—45, a phenomenon into which I should like to obtain some insight. Having regard to the non-employment of women in the Cornish mines, it will not be thought remarkable that at most ages a low rate of female mortality is shown in the districts where they are situate.

Coming to the country districts, which are here arranged in the order of their death-rates at age 55—65, it will be seen that at the several ages the maximum and minimum ratios are as under:—

Age.	Maximum.	Minimum.
0— 5	82·0	55·7
5—15	100·5	75·8
15—25	122·7	90·7
25—35	113·5	83·1
35—45	96·8	77·6
45—55	92·4	69·0
55—65	96·1	70·5
65—75	104·3	77·2

It will be seen that, as already stated, the minimum at age 15—25 is higher than the London ratio, and at age 25—35, the London figure being 88·6, nine out of fourteen country districts appear less healthy than London. But at ages 0—5 and 35—75 the London death-rates are higher than the country maxima, excepting only that at age 65—75, where Lancashire alone shows unfavourably in the comparison.

I think enough has been shown to satisfy any impartial person that the female mortality at age 15—35 at least is widely affected by the migrations to which I called attention long ago. I should not have been led to suppose that the figures at age 5—15 were much affected in this way by any facts known to me, but observing that both in London and in the country the proportionate death-rate at this age occupies an intermediate position between that for the age 0—5 and that for the age 15—25, I am led to imagine that on a deeper investigation some similar influence may here be discovered.

I very much regret that the office of the Registrar-General did not employ its unrivalled resources in investigating this matter

when the question was first raised. It would only be requisite to select a moderate number of country parishes and obtain from them a report as to deaths at age 5—45 (not a large proportion of the total deaths), showing whether the person dying was a native of the vicinity of the death, and if so, whether danger to life (from consumption or some other illness) caused the return of the individual from some place of employment at a distance.

As London is so immense an example of a death-rate depressed in middle life, as I suggest, by reason of the migrations of the working class, I have broken up the total into six portions, in order to see whether the influences which affect the total discernibly affect each of those parts.

The divisions in question are :—

Western.	Marylebone, St. George's Hanover Square, Paddington, Kensington, Chelsea, Hampstead, Hendon, Uxbridge, Staines, Brentford, Fulham, Richmond, and Kingston.
Northern.	St. Pancras, Islington, Hackney, Edmonton, and Barnet.
Southern.	St. Saviour (Southwark), Lambeth, Camberwell, Wandsworth, Lewisham, Croydon, and Bromley.
Eastern.	Shoreditch, Bethnal Green, Whitechapel, St. George-in-the-East, Mile End Old Town, Stepney, Poplar, West Ham, Romford, St. Olave (Southwark), and Greenwich.
Central.	London (City), Strand, Westminster, Holborn, and St. Giles.
Woolwich.	Woolwich and Dartford.

The female death-rates were as under :—

	Death-rates amongst Females at ages						
	0—5.	5—15.	15—25.	25—35.	35—45.	45—55.	55—65.
Western	56·11	4·07	3·49	5·70	9·98	15·40	27·68
Northern	54·59	4·26	3·62	6·39	10·45	15·47	28·45
Southern	56·12	3·69	3·37	5·97	9·80	15·09	27·65
Eastern	64·93	4·58	4·72	7·69	12·29	18·29	33·22
Central	77·17	5·43	4·63	8·43	13·90	20·03	33·93
Woolwich	43·52	4·62	5·10	6·53	9·63	14·82	26·78

It will be observed that the vast populations of the western, northern, and southern parts of London are subject to very similar rates of mortality, and the following table of ratios will make it clear that even in the other divisions (except Woolwich) there is the same gradual lowering of the proportional rates from age 0—5 to age 15—25, and the same gradual ascent afterwards up to age 45—55.

	Proportional Ratios, the National Rate being 100 at each Age.						
	0—5.	5—15.	15—25.	25—35.	35—45.	45—55.	55—65.
Western	107·9	96·4	70·6	77·7	94·6	102·4	97·5
Northern	105·0	100·9	73·3	87·1	99·1	102·9	100·2
Southern	107·9	87·4	68·2	81·3	92·9	100·3	97·4
Eastern	124·9	108·5	95·5	104·8	116·5	121·6	117·0
Central	148·4	128·7	93·7	114·8	131·8	133·2	119·5
Woolwich	83·7	109·5	103·2	89·0	91·3	98·5	94·3

The idea might perhaps be entertained that although the death-rates for country districts show a tendency upwards just when the London rates decline, such a tendency might not be so evident were the statistics of selected "healthy districts" examined. I therefore have picked out 119 healthy districts from the 450 placed under the twenty-fourth head, grouping them thus:—

Northern, with Wales	24 *a*, *b*, *c*, *d*, *e*.
Eastern	24 *f*, *i*, *k*.
Western	24 *g*, *h*.
Southern	24 *l*, *m*, *n*, *o*.

The average death-rates have been calculated as follows:—

	Death-rates of Females aged—						
	0—5.	5—15.	15—25.	25—35.	35—45.	45—55.	55—65.
With low infant mortality—							
12 districts north (with Wales)	24·88	3·32	5·15	7·25	8·32	11·52	21·20
17 „ south	25·51	2·97	4·66	5·93	8·03	10·70	20·65
8 „ west	26·29	3·03	4·98	6·63	6·67	10·97	22·95
With low mortality age 55—65—							
19 districts north (with Wales)	34·12	3·56	5·56	6·94	8·55	10·79	19·09
33 „ east	34·75	3·47	5·46	6·58	7·87	10·12	18·74
9 „ west	33·29	3·56	4·99	6·78	8·31	10·44	19·50
21 „ south	32·09	3·34	4·68	5·84	8·12	10·20	19·46
Total (119 districts)	31·98	3·37	5·13	6·44	8·06	10·46	19·58

These districts, however healthy, ought to show indications (if I am right) similar to those which I have pointed to in the case of country districts generally. For the purpose of testing the question the following table has been calculated:—

	Proportional Ratios, the National Rate being 100 at each Age. Age—						
	0—5.	5—15.	15—25.	25—35.	35—45.	45—55.	55—68.
With low infant mortality—							
12 districts north (with Wales)....	47·9	78·7	104·3	98·8	78·9	76·6	74·6
17 „ south	49·1	70·4	94·3	80·8	76·1	71·1	72·7
8 „ west	50·6	71·8	100·8	90·3	63·2	72·9	80·8
With low mortality age 55—65—							
19 districts north (with Wales)....	65·6	84·4	112·6	94·6	81·0	71·7	62·2
33 „ east	66·8	82·2	110·5	89·6	74·6	67·3	66·0
9 „ west	64·0	84·4	101·0	92·4	78·8	69·4	68·7
21 „ south	61·7	79·1	94·7	79·6	77·0	67·8	68 5
Total (119 districts)	61·5	79·9	103·8	87·7	76·4	69·5	68·9

In every case the ratios rise to a maximum at age 15—25 and fall afterwards, descending in every case but one steadily until age 45—55.

Having so far ratified the argument in the case of female death-rates, I place in Tables III, IV and V the like data as to male death-rates, and I say that although the tendency seems to be much less strong in the case of males, yet it can be traced in many instances.

Beginning with the figures for country districts shown in Table III, it will be seen that the proportionate mortality in thirteen cases out of fourteen steadily rose as between ages 0—5 and 15—25, the exception (not a very remarkable one) being found in the Northampton group of counties. The rate afterwards steadily fell in nine cases until age 35—45 was reached. After that age there was usually an upward tendency, though in many cases not steadily shown.

These facts seem to me to be enough to show that male death-rates in the country were adversely influenced between ages 0—5 and 35—45 by reason of migrations.

In the three columns covered by that period will be found the lowest proportional male death-rates for London and Birmingham, and the age 15—25 shows the lowest proportionate figure in the following cases, viz., London, Birmingham, Manchester, Liverpool, and Sheffield, whilst Leeds and Hull show the lowest rate at age 25—35.

The remarks already made as to pleasure resorts (both inland and seaside) may be repeated here. There is no such excess of male population in middle life at these places as there is of females. The males from distant towns who reside there may include many persons of broken health.

Nottingham mortality amongst males shows most favourably at age 15—55. The male and female death-rates compare thus:—

Age.	Proportion (National Rate = 100).	
	Male.	Female.
0— 5	125·4	121·4
5—15	101·4	100·5
15—25	97·6	109·3
25—35	88·5	109·8
35—45	87·2	101·8
45—55	91·2	104·9
55—65	98·1	106·3
65—75	100·3	105·7

Therefore female death-rates are more aggravated than those of males at each age from 15—25 onwards, and the reason for this is doubtless connected with local conditions. On the whole, the Nottingham figures are very favourable.

In the densely peopled manufacturing and mining districts the female death-rates at age 15—35 are more excessive than those of males, though the latter have their full share of the unfavourable conditions of those localities. The exception here is found in the Cornish mining district, but it may be observed that from this declining district many persons migrate in search of employment, and the highest relative death-rate for each sex is at the age 15—25 most affected by such migrations. The large excess of female population in middle life is doubtless supported by remittances from miners working abroad.

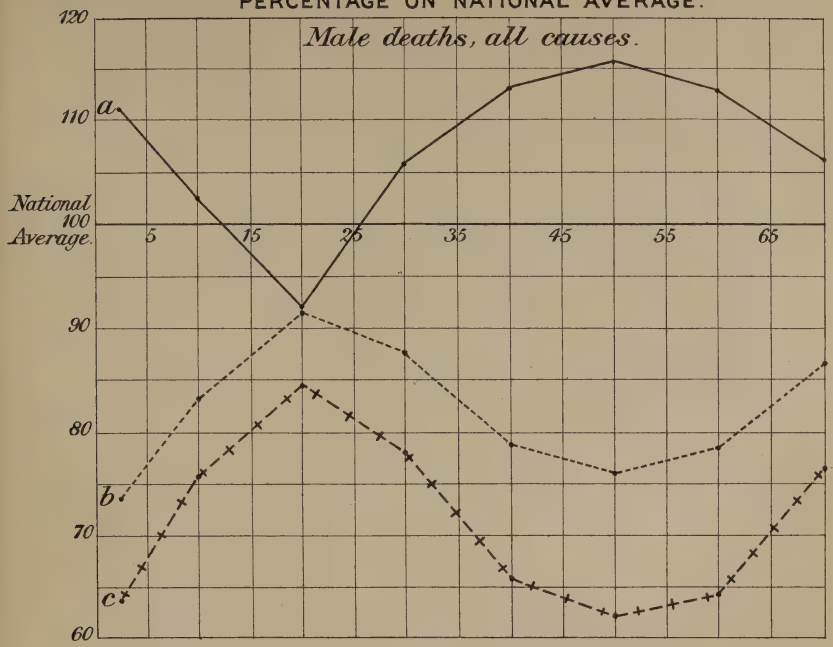
So far as concerns the smaller towns, whether ancient cities or not, one feature of the figures may be noted, viz., that the proportional death-rates are lower amongst females than males at age 15—45, and though there are differences in the same direction at other periods of life, they are much less striking.[3] As regards Newcastle-on-Tyne, I do not pretend to be able to account for its high death-rates amongst both sexes in middle life, which compare unfavourably with those of the densely peopled colliery districts immediately adjacent.

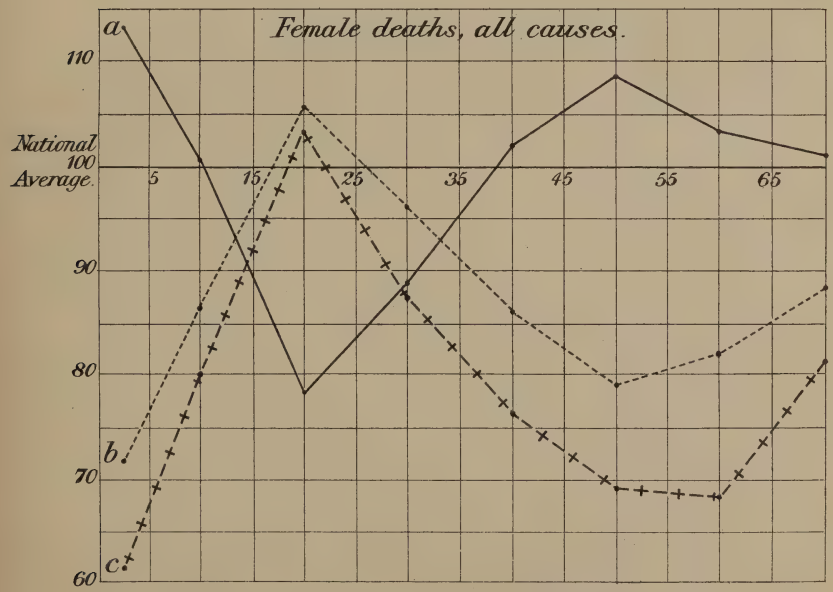
Age.	Males.		Females.	
	Newcastle-on-Tyne.	Colliery District.	Newcastle-on-Tyne.	Colliery District.
0— 5	117·2	109·1	119·8	111·9
5—15	129·2	128·0	127·0	126·1
15—25	124·6	118·0	126·7	124·5
25—35	117·0	88·9	124·5	118·4
35—45	115·5	87·3	121·2	109·7
45—55	117·7	90·6	125·3	105·6
55—65	123·8	101·2	119·1	107·5
65—75	123·1	106·2	114·2	111·2

[3] I conjecture that although in the smaller towns servants and shop assistants are to a great extent drawn from local families, yet this difference of mortality is due to a portion of the female workers in them being attracted from greater distances.

LOCAL DEATH RATES. T.A. WELTON.

PERCENTAGE ON NATIONAL AVERAGE.





a ..... *London and its vicinity.*
b ..... *450 rural Registration districts.*
c ..... *Selected healthy rural districts.*

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Turning to Tables IV and V, it will be seen that whilst London rates go down, country rates go up as between age 0—5 and age 15—25, the single exception being Woolwich (with Dartford), whence I have no doubt many young persons of both sexes come to town for employment. In like manner the rates go down in each country district after 35, and similarly go up in each London district, save Woolwich (with Dartford).

By this time I hope I am preaching to the converted; if not, I am sure no evidence can be adduced which would serve to convince, save the result of such local inquiries as I have suggested, and which could be prosecuted without much delay or expense, should the Department so choose. I find in the decennial "Supplement to the Fifty-fifth Annual Report of the Registrar-General" no allusion to the matter beyond the following paragraph:—

"The difficulty of correction is even greater in the case of another class of persons (than those in institutions), of which domestic servants may be regarded as typical. At the census enumeration domestic servants are included in the population of the district in which they are employed, but of these persons a considerable proportion return to their homes in case of illness, and their deaths are recorded against the districts wherein those homes are situated; as therefore no records are made of the places in which the deceased had been employed, a just distribution of their deaths is impracticable. The consequence is that the districts, mainly towns, in which a relatively large proportion of domestic servants are employed, are made to appear healthier than they really are, whilst the reverse effect is produced on the country districts which furnish the supply of domestic servants to the towns."

With these words, and without any reference to the ages specially affected, Dr. Tatham dismisses the subject of my former essay, and does not make any attempt to determine the importance of the movement the existence of which he thus discloses.

In another place, referring to phthisis, he relates, without apparently taking into his consideration the effect of migrations, that "in twenty-four counties the male death-rates were in excess of the female rates, whilst in the remaining twenty-one counties the female rates were in excess of the male rates." The fact is that at ages 15—35 a very large part (nearly two-fifths) of the total deaths are due to phthisis, and it is especially servants and others affected by this disease who return to their native places when unable to fulfil their duties. Hence the twenty-one counties are those undernoted, mostly consisting of those from which the supply of servants is drawn.

Suffolk	Rutland	Monmouth
Norfolk	Wilts	South Wales
Cambridge	Dorset	North „
Bucks	Derby	York (North Riding)
Huntingdon	Nottingham	Durham
Bedford	Salop	Cumberland
Lincoln	Hereford	Westmorland

II.—*General State of the Country as respects Death-Rates.*

I will first deal with the districts, principally urban, which have been separately shown in the tables, and will afterwards proceed to analyse the facts in relation to the 450 country districts included under the twenty-fourth heading.

The twenty-three towns and districts may be ranged thus, according to the mortality amongst males aged 45—65 :—

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
3. Manchester*	86·04	30·29	53·19	101·05	73·36	23·77	45·23	87·04
2. Liverpool	84·27	28·45	50·76	94·32	74·86	24·00	42·51	80·03
23. Staffordshire potteries	82·59	28·60	50·08	92·74	68·16	17·77	36·46	77·71
6. Sheffield	78·55	25·02	46·79	94·91	67·19	17·42	34·77	74·13
5. Leeds	78·02	23·34	45·52	93·98	65·23	18·48	36·96	77·04
19. Lancashire manufacturing district	76·00	23·09	44·98	91·44	63·16	18·38	38·80	79·87
9. Newcastle-on-Tyne	72·28	22·70	42·92	86·40	62·29	18·85	33·82	68·62
4. Birmingham	68·16	21·65	40·94	81·63	58·67	17·36	32·03	67·21
18. Yorkshire manufacturing district	68·76	21·08	40·66	85·80	57·23	15·37	31·82	70·89
1. London	68·46	22·23	39·12	74·38	59·01	16·28	29·42	60·72
21. South Wales colliery district	68·30	20·61	39·88	76·95	57·54	15·98	31·58	64·22
11. Old cities	60·67	20·87	37·06	73·63	52·01	15·27	28·16	59·35
8. Hull	69·43	20·40	37·46	82·46	57·91	15·95	28·12	61·40
16. Black Country	71·50	18·13	37·53	80·48	60·40	14·44	29·05	66·26
12. Dockyard towns	64·42	20·97	33·37	66·83	55·07	15·40	26 30	58·15
7. Bristol	59·65	19·56	34·73	72·25	48·29	15·08	26·86	57·52
17. Northern colliery district	67·29	17·47	35·07	74·53	58·19	15·89	30·54	66·79
13. Twelve towns	62·81	18·66	33·70	71·20	52·88	14·40	27·39	58·25
10. Nottingham	77·33	17·58	34·00	70·38	63·14	15·77	30·19	63·48
22. Cornish mining district	61·06	17·24	32·73	67·48	52·90	10·06	21·62	51·48
15. Inland pleasure places	47·75	17·92	31·41	68·69	38·76	13·06	24·84	54·64
20. Barrow-in-Furness	58·40	16·25	33·07	70·48	51·86	14·66	34·12	68·31
14. Seaside pleasure places	48·44	17·29	28·43	59·77	39·29	12·35	22·58	49·22

* The County Lunatic Asylum, Prestwich, may be accountable for a considerable number of deaths. There is no similar institution at Liverpool.

With some qualifications I think the above table establishes

the following conclusions as to the rank of the several places with respect to their mortality:—

1. The six first named must be ranked as the least healthy. Nottingham, as regards the age 0—5, might be ranked with them, but at later ages the difference is great.

2. The next eight may also be ranked together, though the rate at age 0—5 in old cities is relatively low, and perhaps the northern colliery district should be thrown into this class, and the old cities into the next.

3. The remaining seven districts (excluding the northern colliery district and Nottingham) may well be ranked lowest, and the exact order of their ranking may be a matter of opinion in some cases. The low female mortality at age 45—65 in the Cornish mining district is possibly due to the fact that many Cornish women being supported by remittances from abroad and living in a very healthy country, their condition is equal to that of residents in the most favoured rural districts.

Here it will be desirable to introduce details as to the mortality in particular places making up the principal groups. The first of these in order of mortality is the Lancashire manufacturing district:—

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Preston	94·96	26·99	45·90	87·69	78·05	22·31	41·50	79·61
Chorley	65·60	19·94	37·01	79·32	51·34	15·44	34·62	73·99
Blackburn	85·55	24·22	48·34	96·28	70·95	20·31	42·48	80·73
Burnley	86·67	21·69	43·23	93·49	68·00	17·68	36·65	79·94
Haslingden	67·87	20·44	42·70	93·42	57·50	16·89	39·42	78·20
Rochdale	65·28	24·10	48·01	96·86	52·73	16·60	37·96	78·31
Bury	70·42	23·41	46·27	95·92	58·89	18·10	37·77	84·16
Bolton	72·14	23·59	46·41	96·22	60·54	19·00	39·96	81·13
Oldham	84·16	26·15	48·39	102·47	68·78	19·69	39·91	86·96
Ashton-under-Lyne	78·25	23·55	47·44	95·80	65·63	18·76	41·44	87·36
Barton-on-Irwell	57·89	17·68	40·13	78·11	50·47	14·85	31·06	68·89
Stockport	79·15	24·18	45·26	90·32	64·78	19·21	41·18	84·15
Hayfield	64·81	21·29	39·48	81·37	53·06	15·91	37·23	70·91
Macclesfield	64·48	22·70	38·71	78·01	48·89	17·16	37·01	80·00
Leigh	73·51	18·36	41·56	84·07	58·74	15·30	34·19	69·87
Wigan	78·13	21·68	46·62	88·57	68·67	17·75	38·67	80·54
Prescot	73·27	24·29	46·91	91·29	64·11	19·74	39·54	75·31
Warrington	68·33	22·00	40·19	92·44	58·01	17·82	34·62	74·94
Runcorn	60·45	17·39	33·84	80·08	49·66	14·55	30·35	63·39
Contrasted with country districts—								
Norfolk, Suffolk, &c.	44·37	11·85	22·97	53·29	35·75	10·38	20·03	46·41

Here it is only too easily visible that a very unfavourable condition of things exists all over this important portion of the north-western counties. The least unhealthy districts are generally

those which do not include the central portion of any large town. A word of remark is due to Rochdale, for its relatively low mortality at age 0—5 seems to show greater parental care than is evidenced, for example, in Blackburn. Possibly the women of Blackburn live under worse conditions than those of Rochdale (their death-rates being markedly higher), and are unable to give so much attention to their infants. It would be unkind to say that a very high mortality at age 0—5 is a sign of barbarous carelessness, yet in particular cases I fear there really is a callous disregard of the claims of infancy.

The next group is of a similar character, being that of Yorkshire manufacturing and mining districts:—

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Keighley	63·45	19·99	40·78	84·81	51·20	13·69	33·83	76·57
Todmorden	55·67	18·43	41·80	97·94	47·51	14·36	33·69	79·91
Saddleworth	62·69	18·95	42·55	84·97	49·64	15·26	32·23	73·82
Huddersfield	68·27	22·55	42·30	87·67	56·21	14·53	29·47	68·08
Halifax	63·19	23·85	45·27	91·71	53·82	15·55	30·84	69·61
Bradford	71·65	22·20	43·72	91·04	58·75	16·54	34·32	76·95
Dewsbury	75·70	20·00	39·04	86·80	62·75	14·73	31·56	67·33
Wakefield	68·41	23·19	42·20	86·42	57·46	18·26	36·57	70·31
Pontefract....	69·44	15·77	32·82	68·99	57·66	11·68	27·74	62·87
Barnsley	72·74	18·25	32·28	83·11	60·74	14·62	28·31	74·23
Rotherham	62·28	18·30	34·56	74·89	53·95	14·73	28·84	65·06
Doncaster	58·18	14·95	30·21	66·95	48·88	12·45	24·47	53·67
Middlesbro'	75·00	23·06	41·02	80·81	62·28	17·02	34·89	76·74

The infantile death-rate in Dewsbury and Pontefract seems disproportionately high compared with the mortality amongst adults, and that in Middlesborough is probably susceptible of a large reduction. Those acquainted with the respective localities may find other points of interest in the table.

The next group to be dealt with comprehends the South Wales colliery district:—

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Abergavenny	62·53	24·00	45·33	85·36	47·23	17·98	32·09	73·93
Pontypool.....	55·62	17·77	34·31	69·36	46·67	13·73	28·63	62·71
Bedwelty	84·47	26·71	51·63	94·10	69·57	17·15	37·67	74·93
Newport	69·97	18·21	32·70	65·42	51·66	15·83	29·62	58·63
Cardiff	64·00	21·67	37·84	71·78	55·66	16·35	31·91	58·65
Pontypridd	78·04	18·41	38·13	76·08	63·51	15·02	30·34	63·33
Merthyr Tydfil	74·87	22·87	46·41	91·58	65·52	18·15	35·57	72·51
Bridgend	61·31	20·65	34·20	68·38	49·95	15·71	29·31	60·72
Neath	57·58	18·09	37·65	77·44	48·65	14·09	28·96	61·40
Swansea	67·03	19·32	39·44	71·17	56·21	14·78	28·73	63·36
Crickhowell	65·91	18·79	40·94	78·21	58·56	17·27	34·60	58·63

It is difficult to resist the conclusion that the infant mortality in Pontypridd might be brought down nearly to the level of the Cardiff rate, since there is no great disparity in the figures for higher ages.

We next come to a group of eight old cities varying much in size, and in almost every other respect. They are shown in the order of their size :—

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Norwich	70·58	17·36	30·60	65·35	57·67	12·89	25·81	54·99
York	58·27	21·30	37·88	80·48	52·61	15·78	30·10	62·37
Chester	48·40	21·55	39·37	74·49	42·48	16·57	28·46	63·52
Carlisle	56·72	20·14	37·71	74·42	46·92	16·96	31·99	64·34
Exeter	68·85	21·84	40·66	69·66	61·81	15·53	26·50	55·24
Worcester	69·93	23·22	42·37	78·37	58·13	17·13	26·74	60·94
Canterbury	59·15	25·77	38·35	79·29	51·95	12·19	28·26	53·00
Chichester ...	42·27	27·36	34·85	79·17	36·13	12·72	27·34	54·55

The following notes will throw some light on the discrepancies in the above figures :—

Norwich.—The Norfolk and Norwich Hospital, the Jenny Lind Infirmary for Children, and the Bethel Lunatic Hospital, are accountable for 705 deaths. On the other hand, the Norwich City Lunatic Asylum, where 233 deaths occurred, is situate outside, in St. Faith's district. The total deaths were 18,717.

Chester.—There were 645 deaths in the County Lunatic Asylum, out of a total of 14,395.

York.—There were 1,171 deaths in the County Hospital and the North Riding Lunatic Asylum, out of a total of 15,954.

Carlisle.—There were 895 deaths in the Cumberland Infirmary and the Cumberland and Westmorland Lunatic Asylum, out of a total of 10,811.

Exeter.—There were 557 deaths in the Devon and Exeter Hospital; but the Exeter Sanatorium and Exeter Borough Lunatic Asylum, where 100 deaths occurred, are situated outside, in the St. Thomas district. The total deaths were 8,191.

Worcester.—There were 555 deaths in the Worcester General Infirmary, out of a total of 7,933.

Canterbury.—There were 592 deaths in the Kent and Canterbury Hospital, out of a total of 3,700.

Chichester.—There were 195 deaths in the General Infirmary and Dispensary, out of a total of 1,544.

When it is considered that the deaths in these institutions affect the mortality very unequally at different ages, it will be

understood that they introduce an element of uncertainty which it is difficult to measure. The cities least influenced are Norwich, Chester, and Exeter; those most largely affected are Canterbury, Chichester, and Carlisle. Male death-rates at age 45—55 seem to be specially influenced.

Here it may be permissible to point out that by a new departure, involving no great difficulty, the mortuary statistics of this country might be improved.

The volume with which I am dealing refers to entire districts, but the annual returns give the figures for sub-districts. I suggest, by way of placing all the sub-districts on a level, that the deaths in workhouses should be shown separately in every case. I also suggest that where a workhouse is situate out of its own district, it should, for the purposes of these returns, be reckoned as part of its district, the average population and deaths being transferred thereto. And as regards county lunatic asylums, hospitals, &c., I suggest that these should be treated as separate entities, leaving to the localities only institutions deemed purely local. The total population and deaths at each age in county institutions could be shown for each county, and it would then be in the power of any inquirer to make apportionments as might be thought just of these figures over the whole of the districts included in the county. The case of joint institutions for more than one county would present no insuperable difficulty, only calling for a separate heading.

Returning to the eight cities, I think it will be right to account Norwich, Exeter, Worcester, and York least healthy, and Chester and Chichester most favourably circumstanced, though it is not a matter free from doubt, having regard to the comparatively low mortality of Norwich at ages 45—75, and to the great difficulty in even roughly estimating the effect of deaths in hospitals.

The next group deserving attention is that of the districts making up the "Black Country."

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Wolverhampton	70·16	20·42	41·21	86·44	60·93	16·35	32·63	66·52
Walsall	69·16	17·35	37·61	79·54	59·44	15·80	29·95	71·65
West Bromwich	72·43	18·26	36·70	79·46	59·05	13·44	28·52	64·52
Dudley	74·78	17·13	38·10	79·64	63·21	13·42	28·81	66·94
Stourbridge	69·14	16·19	30·64	73·59	57·72	12·76	22·91	62·44

The mortality in these districts at age 45—55 is low, except in the case of Wolverhampton, where the South Staffordshire Hospital is situate.

The dockyard towns are three in number, viz., Chatham (with Rochester), Portsmouth (with Gosport), and Devonport (with Plymouth). Their mortality is affected by the existence of naval hospitals, as will be noticed below:—

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Chatham	57·70	19·61	32·49	63·99	47·77	13·86	26·84	56·26
Portsmouth	61·24	20·99	34·01	66·26	51·71	15·90	25·94	57·98
Devonport....	71·87	21·62	33·08	68·56	63·28	15·50	26·46	58·92

Chatham.—There were 752 deaths in St. Bartholomew's Hospital, Fort Pitt Hospital, St. William's Hospital, and the Royal Naval Hospital, out of a total of 12,036 deaths.

Portsmouth.—There were 1,619 deaths in the Royal Portsmouth, Portsea and Gosport Hospital, the Garrison Station Hospital, the R.M.A. Infirmary, the Women and Children's Hospital, R.M.A., the Naval Hospital, Haslar, and the Military Hospital, Gosport Station, out of a total of 31,622 deaths.

Devonport and Plymouth.—There were 1,522 deaths in the Royal Naval Hospital, the Royal Albert Hospital, the Military Hospital, and the South Devon and East Cornwall Hospital, out of a total of 30,352 deaths.

Here it is pretty plain that Devonport is the least healthy place, but Portsmouth runs it rather close.

We now come to the northern colliery district, where the infantile death-rate closely approaches that observed in the South Wales colliery district, but the mortality of adult males is materially lower:—

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Stockton	64·81	22·38	39·95	74·52	54·63	17·98	31·72	64·10
Hartlepool	63·36	17·43	34·87	69·17	55·14	16·59	28·69	65·43
Auckland.	64·55	13·12	31·14	72·92	54·17	14·00	27·05	64·38
Lanchester	61·42	15·38	31·49	67·18	51·74	13·56	29·05	63·65
Durham	65·22	15·33	31·67	73·30	56·02	14·22	28·69	65·09
Easington.....	69·61	13·48	31·56	63·35	59·12	13·78	27·59	61·81
Houghton-le-Spring	70·36	15·53	29·87	73·81	62·09	15·69	29·19	62·39
Chester-le-Street	68·14	14·39	28·81	73·29	60·53	15·15	25·37	57·17
Sunderland	77·40	19·31	39·71	79·35	66·41	17·20	35·06	69·96
South Shields	66·11	20·56	40·20	81·58	59·56	17·26	33·40	73·03
Tynemouth	63·47	17·40	34·27	75·96	55·30	15·55	29·74	69·61

In this table the relatively low rates of mortality amongst males aged 45—55 in Auckland and Easington bear out the state-

ment that a well-ventilated coal mine is really a healthy place. The mortality in the rural parts of Devon and Cornwall is very similar. Female death-rates in these districts at the same ages are relatively much heavier, the Devonshire figure being 10·90 per 1,000.

The next group is one of twelve towns of third rate and smaller size, selected for the reason that they were not too much mixed up with country districts, as is the case with (for instance) Shrewsbury, Salisbury, and Hereford.

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Leicester	86·28	19·09	36·37	75·67	70·43	14·05	28·07	61·18
Southampton*	48·70	19·56	31·99	63·75	41·29	13·71	24·45	51·23
Northampton	65·33	18·19	33·78	79·90	56·39	14·98	29·04	64·69
Derby	61·92	17·17	35·17	75·30	51·11	15·32	32·65	71·38
Ipswich	62·24	17·70	33·49	71·28	51·06	13·84	26·10	59·98
Maidstone	52·20	21·22	34·99	71·50	44·13	18·31	30·80	59·08
Coventry	59·73	16·18	32·71	73·00	48·14	14·73	26·20	59·12
Reading	48·34	18·41	31·86	63·99	41·12	12·24	27·21	53·32
Yarmouth	73·83	20·21	31·84	71·23	61·41	13·76	25·39	54·84
Cambridge	51·58	22·81	39·66	71·23	50·34	14·40	26·23	49·94
Colchester	51·75	17·81	29·62	74·43	47·78	14·32	25·51	57·61
Oxford	60·44	14·33	26·80	55·78	50·00	12·92	23·27	48·12

* Including South Stoneham.

Leicester.—There were 1,682 deaths in the General Infirmary and the Leicester and Rutland Counties Lunatic Asylum; but outside the district there were 622 deaths in the Leicester Borough Lunatic Asylum and in the Leicester Borough Hospital. The total deaths in the district were 26,984.

Southampton.—There were 967 deaths in the Royal South Hants Infirmary, the Royal Victoria Hospital, and the Military Lunatic Hospital, out of a total of 17,253 deaths.

Northampton.—There were 1,695 deaths in the General Infirmary, St. Andrew's Lunatic Hospital, and the County Lunatic Asylum, out of a total of 13,861 deaths.

Derby.—There were 899 deaths in the Derbyshire General Infirmary; but outside the district there were 790 deaths in the Derby Workhouse, the Derby Sanatorium, and the Derby Borough Lunatic Asylum. The total mortality was 14,946 deaths.

Ipswich.—There were 355 deaths in the East Suffolk and Ipswich Hospital, out of a total of 10,318 deaths.

Maidstone.—There were 1,646 deaths in the West Kent General Hospital and the County Lunatic Asylum, out of a total of 9,427.

Coventry.—There were 320 deaths in the Coventry and Warwick Hospital, out of a total of 8,918 deaths.

Reading.—There were 706 deaths in the Royal Berks Hospital out of a total of 8,312 deaths.

Yarmouth.—There were 127 deaths in the Royal Naval Lunatic Hospital, out of a total of 7,949 deaths.

Cambridge.—There were 750 deaths in Addenbrooke's Hospital, out of a total of 6,436 deaths.

Colchester.—There were 462 deaths in the Essex and Colchester Hospital, the Camp and Lock Hospital, and the Eastern Counties Idiot Asylum, out of a total of 5,492.

Oxford.—There were outside the district 308 deaths in the Oxford Union Workhouse. The total deaths in the district numbered 3,467.

The place most unfavourably affected by deaths of strangers in institutions was evidently Maidstone. Northampton and Cambridge came next. Having regard to these facts, it is rather difficult to marshal the twelve towns in the order of their salubrity, but the high infantile death-rates at Leicester and Yarmouth claim a word of notice, as well as the low ones at Southampton and Reading. It is true, Southampton alone, without the inclusion of South Stoneham, shows a death-rate at the age 0—5 of 57·69 per 1,000 boys and 49·46 per 1,000 girls.

The facts disclosed will, I am afraid, have the effect of shaking confidence in the statistics as to deaths, even at age 45—75, and must at least induce us all to think over the local circumstances, before attaching value to any death-rate whatever. On the other hand many of the figures in Table I rest on a broad basis, and could not be materially varied by any conceivable correction.

The Cornish mining district is interesting, partly because of the excess of females there. I contrast below three mining districts:—

	Age 25—35.		Age 35—45.	
	Males.	Females.	Males.	Females.
South Wales colliery district	67,214	56,561	47,641	41,000
Northern „ „	67,093	60,507	50,873	44,765
Cornish mining district.....	11,461	15,886	9,175	12,837

I annex the usual table :—

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Liskeard	46·13	17·87	30·91	64·90	42·00	10·05	19·89	53·31
St. Austell	53·46	12·66	29·42	66·46	47·84	8·31	22·03	49·18
Truro	56·42	17·23	30·58	63·30	46·55	10·57	21·46	51·17
Helston	68·67	14·87	30·00	64·23	55·09	11·88	22·44	47·55
Redruth	71·12	21·38	44·33	79·55	62·30	9·99	23·59	56·81
Penzance	64·36	17·09	29·18	66·60	56·52	9·89	20·12	49·16

No institution is noted as existing in either of these districts. The county lunatic asylum is at Bodmin, not included in these districts. Query, can it be the case that every Cornishman of vigour has gone away, and those who stay at home are but a feeble remnant? The women seem marvellously healthy. Compare the mortality in country districts as shown in Table I.

The inland "pleasure places" selected are only four in number. Tunbridge includes both the town of that name and the separate town of Tunbridge Wells. Warwick includes Leamington.

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Warwick	49·03	19·17	32·60	71·51	39·30	13·96	26·61	53·24
Cheltenham	53·82	15·35	31·56	66·34	44·40	12·35	23·27	54·85
Bath	49·50	20·70	34·14	74·72	39·95	14·30	26·26	56·21
Tunbridge....	39·56	15·56	26·44	60·17	32·17	11·10	22·40	53·23

Warwick.—There were 1,056 deaths in the Warneford Hospital, the Midland Counties Home for Incurables, and the County Lunatic Asylum, out of a total of 9,787 deaths.

Bath.—There were 913 deaths in the Royal United Hospital and the Mineral Water Hospital, out of a total of 13,495.

No similar institutions are stated to exist in Cheltenham and Tunbridge, where the mortality at age 45—65, amongst both sexes, is lower.

The last group to be shown in detail is that of the seaside "pleasure places." Many of these convey information in their titles as to the name of the principal place within their bounds; but, it may be well to say, that East Preston includes Worthing and Littlehampton, Thanet includes Margate and Ramsgate, the Isle of Wight includes Ventnor and other well known

places; Christchurch includes Bournemouth, Newton Abbot includes Torquay, Barnstaple includes Ilfracombe and Lynton, Axbridge includes Weston-super-Mare, and Conway includes Llandudno.

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Brighton*	59·92	19·77	30·98	61·79	49·07	13·80	23·62	50·18
Hastings	49·46	20·71	29·23	61·67	39·18	12·46	22·25	46·22
Eastbourne	49·30	16·67	23·90	57·85	37·85	10·67	18·96	48·62
Christchurch	45·36	17·55	26·31	59·33	34·61	10·90	20·18	46·20
Newton Abbot	47·17	15·25	27·98	58·71	36·08	10·50	22·27	46·97
Scarborough	57·63	17·46	29·60	65·98	47·36	13·78	24·90	55·12
Isle of Wight	35·44	15·50	25·45	51·78	28·67	9·84	20·82	48·85
Thanet	52·77	19·48	31·41	66·55	45·83	14·51	24·20	50·83
East Preston	37·10	14·63	26·48	54·86	29·70	13·15	20·15	48·28
Barnstaple	45·80	12·69	24·04	55·82	37·88	11·70	23·52	46·40
Axbridge	40·87	15·78	26·87	55·16	32·96	11·87	21·11	48·64
Aberystwith	36·69	19·42	36·73	73·33	33·71	13·39	24·22	56·66
Conway	38·00	13·90	27·68	63·71	31·45	14·17	25·99	50·22

* Including the districts of Brighton and Steyning, the latter including Hove.

Brighton.—There were 1,140 deaths in the County Hospital, out of a total of 26,858.

Christchurch (*Bournemouth*).—There were 236 deaths in the National Sanatorium, the Herbert Convalescent Home, and the Firs Bank Convalescent Home, out of a total of 6,305.

Isle of Wight.—There were 522 deaths in the Royal Infirmary, the National Consumption Hospital, and St. Catherine's Home for Consumption, out of a total of 11,541.

Thanet.—There were 277 deaths in the Metropolitan Infirmary (Dane Hill), the Metropolitan Infirmary (Chateau Bellevue), the Royal Sea Bathing Infirmary, and two Convalescent Homes, out of a total of 9,624.

Axbridge (*Weston-super-Mare*).—There were 275 deaths in the West of England Sanatorium, the Weston-super-Mare Hospital, and St. Michael's Home for Consumption, out of a total of 6,934.

Considering the inducements there are to locate hospitals in places generally recommended by the medical faculty as health resorts, it seems to me surprising that there are so few large hospitals, and consequently so few deaths, in institutions of that nature at one or other of these places. I have already referred to the correction of the "average population," which would, I think, upon inquiry be found necessary in order to obtain approximately correct death-rates.[4]

[4] The proportion of deaths in asylums and hospitals situate in London (as defined) to total deaths there, is about 8·0 per cent., whereof apparently nearly

I now come to the 450 remaining districts grouped as "country "districts" under the twenty-fourth heading.

It will be understood that the average death-rates in these groups depend very much on the inclusion or exclusion of individual places, and I shall have some particulars to furnish later as to the inclusion of some places of more than usually high mortality. Yet a sufficient number of such districts have been excluded, to render the residue fairly representative of rural conditions. The range of average mortality in the fourteen sub-groups into which the counties are divided was as below:—

Ages.	Male Death rates per Thousand.		Female Death-rates per Thousand.		Mean Death-rates per Thousand.	
	Lowest.	Highest.	Lowest.	Highest.	Males.	Females.
0— 5	35·77	51·67	28·95	42·64	44·72	36·71
45—55	11·85	16·50	10·38	13·89	14·69	11·94
55—65	22·97	32·39	20·03	27·28	26·82	23·22
65—75	53·29	69·22	46·41	62·68	60·30	53·15

The "mean death-rates" shown above are the averages of the two ratios most remote from the extremes.

The range of mortality in individual districts proves, as might be anticipated, to be much wider. If it were imagined that a great majority of the 450 would closely approximate to the "mean" figures, however much divergence might exist in other cases, that idea would be found erroneous. Even excluding extreme cases, the range is rather wide, and centres somewhat below the mean.

1·5 per cent. come from districts outside London. In the several large towns the proportions are as under:—

	Per Cent.		Per Cent.
Liverpool	3·1	Bristol	7·1
Manchester	6·2	Hull	3·0
Birmingham	6·1	Newcastle	3·1
Leeds	2·9	Nottingham	0·7
Sheffield	nil		

The average proportion of deaths in England and Wales which took place in asylums and hospitals (not workhouses nor workhouse infirmaries) was slightly over 3½ per cent.

The death-rates in particular parts of large towns are enormously affected by the local distribution of their hospitals and workhouses; the mortality in London city being apparently raised 29·9 per cent., and that in Holborn district lowered 11·9 per cent. through the operation of such causes. As the numbers of deaths at several periods of life are very unequally affected, even these figures inadequately express the disturbance caused.

At age 0—5, the districts may be grouped as follows :—

Males, death-rate under			30	.....	14
,,	30	and under	35	.....	48
,,	35	,,	40	.....	124
,,	40	,,	45	.....	113
,,	45	,,	50	.....	70
,,	50	,,	55	.....	52
,,	55	and upwards		.....	29

Only one-third were much above the mean ratio.

Females, death-rate under			25	.....	17
,,	25	and under	30	.....	77
,,	30	,,	35	.....	159
,,	35	,,	40	.....	107
,,	40	,,	45	.....	58
,,	45	,,	50	.....	24
,,	50	and upwards		.....	8

About 56 per cent. were below and 44 per cent. above the death-rate (35 per 1,000) nearest the mean ratio.

At age 45—55 the death-rates ranged as under :—

Males, death-rate under			10	.....	34
,,	10	and under	12	.....	95
,,	12	,,	14	.....	129
,,	14	,,	16	.....	105
,,	16	,,	18	.....	41
,,	18	,,	20	.....	21
,,	20	and upwards		.....	25

More than one-half were below the ratio (14 per 1,000) which approximates to the mean ratio.

Females, death-rate under			8	.....	10
,,	8	and under	10	.....	94
,,	10	,,	12	.....	191
,,	12	,,	14	.....	105
,,	14	,,	16	.....	29
,,	16	,,	18	.....	15
,,	18	and upwards		.....	6

About two-thirds were under the mean.

At age 55—65 the death-rates ranged as under :—

Males, death-rate under			20	.....	29
,,	20	and under	24	.....	144
,,	24	,,	28	.....	150
,,	28	,,	32	.....	69
,,	32	,,	36	.....	40
,,	36	,,	40	.....	12
,,	40	and upwards		.....	6

The "mean point" being 26·82, it will be seen that the major portion were lower.

Females, death-rate under		18	.....	26
,,	18 and under	21	.....	132
,,	21 ,,	24	.....	162
,,	24 ,,	28	.....	94
,,	28 ,,	32	.....	25
,,	32 and upwards		.....	11

Less than one-third were over 24.

Then at age 65—75, making the intervals more irregular in order to obtain a closer idea of the extent of divergence, I find the death-rates ranged as under.

Males, death-rate under		50	.....	44
,,	50 and under	53	.....	44
,,	53 ,,	60	.....	181
,,	60 ,,	65	.....	86
,,	65 ,,	68	.....	32
,,	68 ,,	70	.....	11
,,	70 and upwards		.....	52

The mean death-rate being 60·30, about three-fifths of the ratios were below that point.

Females, death-rate under		42	.....	15
,,	42 and under	45	.....	34
,,	45 ,,	53	.....	204
,,	53 ,,	56	.....	75
,,	56 ,,	60	.....	62
,,	60 ,,	63	.....	22
,,	63 and upwards		.....	38

The mean death-rate being 53·15, about 56 per cent. were at and below that point.

Tables VI to IX give similar information for each of the fourteen groups of counties.

Table X shows the mortality at the same ages in 103 registration districts, being those of the 450 "Country Districts" where the mortality of either sex rises to a maximum height at either age. I have split them up into six groups, four of which groups include only districts where there are no public institutions (such as county lunatic asylums) responsible for part of the deaths, and the others include the districts affected by such institutions.

Before speaking of the districts in detail, I will consider the groups collectively, and will compare their mortality (arithmetical mean rate, without regard to their size) with the mean rural mortality already shown.

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
Mean rural mortality	44·72	14·69	26·82	60·30	36·71	11·94	23·22	53·15
Group.								
a. 21 districts, high infantile rate	56·29	13·85	26·76	60·21	47·64	11·55	23·71	53·21
b. 10 districts, high infantile and later.....	58·98	17·69	33·61	74·85	48·81	14·77	28·89	64·49
c. 8 districts, high mortality after 45	42·69	20·01	35·69	72·93	34·29	14·63	26·60	60·16
d. 26 districts, high mortality after 65	44·72	14·77	29·50	68·54	36·75	12·87	25·36	61·18
e. 31 districts (with asylum), high mortality after 45	44·62	21·46	35·14	71·36	36·74	15·46	28·19	60·26
f. 7 districts (with asylum), but mortality less high at 45—55	52·57	15·37	30·69	68·48	42·13	13·85	27·62	60·27

It will be understood that the most unfavourable death-rates are probably those in the forty-four districts placed under heads *b*, *c*, and *d*, because the rates in the groups *e* and *f* are so largely influenced by institutions as to make them imperfect as indications of insalubrity.

The twenty-one districts in group "*a*" are solely remarkable for their infantile death-rates. The three ranking highest, and the fifth, are districts where the stocking manufacture is the leading industry. It will not be forgotten that the male death-rate at age 0—5 is 77·33 in Nottingham and 86·28 in Leicester. It may, I think, be inferred that in the hosiery and lace making districts there is less than an average amount of maternal care for infants. The district of Strood, which includes Northfleet and extends from the vicinity of Gravesend to that of Chatham, shows a higher death-rate at age 0—5 than that of Chatham itself. Caistor includes Great Grimsby, and Falmouth again is a seaport, but Nuneaton presents no special feature. The remaining districts will be found in the table, and seem to call for no remark.

The districts in group "*b*" are only ten in number, and the four ranking highest are colliery districts. Without being especially dangerous to life, such districts are not remarkable for tenderness in its preservation. It is rather curious to find the district of Fylde ranking next, which embraces two watering places (Blackpool and Lytham) and the small seaport of Fleetwood. I conjecture that here, as in other cases, the return of average population should be amended. The other districts are

Northwich (the chief seat of salt making), Gravesend, Cockermouth (another mining district), Leek (where silk is manufactured), and Luton, the central seat of the straw hat manufacture.

Group "*c*," whilst showing moderate death-rates at the age 0—5, seems specially unhealthy for adult males. It takes in only eight districts, the first four of which are (or were) important seats of lead mining operations, which are known to impair health very much. Ormskirk includes the large health resort of Southport, and here again some rectification of average population may be called for.

Group "*d*" comprehends twenty-six districts, and shows about the mean rate of mortality at ages 0—5 and 45—55. At higher ages there is an excess of 10 or 15 per cent.

The worst example in this group is Holywell, where both lead and coal are raised. The other districts ranking high are many of them on the fringe of some manufacturing or mining district, for instance, Clitheroe, Haltwhistle, Llanelly, Skipton, Pontardawe, Congleton, Altrincham, and Alnwick may be so classed. I cannot say what has raised the male mortality at age 65—75 so high in Berwick; it is one-fourth more than the mean rural rate, whilst the rate amongst females of like age is much less aggravated.

When we come to group "*e*," embracing as many as 31 districts, I have to point out that the mortality at age 0—5 agrees with the mean, but at higher ages the rates are naturally very high. The utility of the list is mainly that of a warning not to put any trust in the published death-rates for these particular districts. The same observation also applies to group "*f*," which includes two districts containing hospitals, but not public lunatic asylums, in which districts the death-rate at age 0—5 is noticeably high.

Going back to the first part of this paper, reference may be made to the particulars in Table IV as to mortality in 119 healthy districts. It will be seen that (as might be anticipated) the averages fall materially below the mean rates for country districts. I should add that although these districts have been selected because of the low rates visible upon the face of the tables, other districts, when accurately treated, might appear in a light at least as favourable as these. Where population is small, the ratios are less regular, and a low rate at one age may be accompanied by a high one at the next, so that the averages of groups are by far the most reliable.[5]

[5] The districts included in the 450 country districts where there were deaths

The collective population and average death-rates in the 450 registration districts may be thus stated :—

Ages.	Population (Average, 1881-90.		Deaths, 1881-90.		Death-rates.	
	Males.	Females.	Males.	Females.	Males.	Females.
0— 5	602,890	604,608	274,616	225,896	45·55	37·36
5—15	1,134,851	1,117,623	39,459	40,863	3·48	3·66
15—25	868,457	844,547	39,341	43,969	4·53	5·21
25—35	612,157	658,542	41,545	46,431	6·79	7·05
35—45	495,352	530,240	48,352	48,224	9·76	9·09
45—55	401,284	433,371	58,731	51,856	14·64	11·97
55 and upwards	592,056	648,612	336,700	335,573	—	—
Totals	4,707,047	4,837,543	838,744	792,812	—	—

If we venture to assume[6] that but for the effect of migrations the rural mortality would average at age 5—35 not more than 80 per cent. of the national averages, the numbers of deaths really attributable to these districts in 1881-90 must be less, viz. :—

	Age 5—15.		15—25.		25—35.	
	Males.	Females.	Males.	Females.	Males.	Females.
Deaths recorded	39,459	40,863	39,341	43,969	41,545	46,431
„ estimated	37,949	37,731	34,391	33,376	37,856	38,669
Differences	1,510	3,132	4,950	10,593	3,689	7,762

The total of these differences is 31,636, pointing to about 3,164 annual deaths, being those of persons not fairly chargeable to the districts where their deaths occurred. Supposing this number of

in public hospitals or asylums, but which (through not showing an extreme death-rate) were not mentioned in Table X, are these:—

	Deaths.		Deaths.
Winchester	309	St. Thomas (Devon)	818
Hertford	174	Bodmin	455
Hemel Hempstead	143	Taunton	356
Huntingdon	109	Solihull	119
Bedford	333	Stamford	109
Chesterton	331	Beverley	266
St. Faith's (Norfolk)	233	Castle Ward	285
Dorchester	508	Brecknock	63

Where hospitals are situate in large towns, I have not noticed them.

[6] This can only be an assumption, in the absence of the knowledge easily obtainable by the aid of the clergy and medical men in a few rural parishes. It is based on the belief that those resident in rural districts, and not going there because of ill-health, are at all ages about equally healthy.

deaths to be charged against the metropolis and other places where mortality at these ages is disproportionately low, the effect would merely be to remove the anomalous indications of healthfulness in certain towns, without converting it into an excess in the opposite direction.

If then we are of opinion that under ordinary circumstances the mean death-rates in rural districts should average about as under :—

Age	0—5.	5—15.	15—25.	25—35.	35—45.	45—55.	55—65.
Males	45·55	3·34	3·96	6·18	9·76	14·64	27·19
Females	37·36	3·38	3·95	5·87	9·09	11·97	23·30

we obtain a standard by which to measure the excess in dense and unhealthy localities, and are enabled to say with confidence that in the worst examples the natural mortality is fully doubled.

Tables I to III will supply (subject to remarks made elsewhere) a general idea as to the range of mortality in particular places, but Table XI is added as affording at a glance information as to where either sex appears to suffer more or less than the other. Out of the twenty-three towns and groups of places those which show a strikingly excessive female mortality are :—

Nottingham.
Northern colliery districts.
South Wales colliery districts.
Newcastle-on-Tyne.
Barrow-in-Furness.
Staffordshire potteries, at age 15—35.
Black Country.
Lancashire manufacturing districts.
Yorkshire manufacturing districts, at age 15—35,

and, in a less degree, Leeds, Hull, and Liverpool are unfavourable to females.

Male mortality is strikingly high compared with that of females in :—

Staffordshire potteries, age 45—65.
Sheffield (especially after 35).
Seaside pleasure places.[7]
Inland pleasure places.[7]

[7] Due I think to inaccuracy in population and migrations.

Bristol (at age 15—35).[8]
London (at age 15—45).[8]
Manchester (at age 15—45).[8]
Old cities (at age 15 upwards).[8]
Dockyard towns (at age 15—55).[8]
Twelve other towns (at age 15—35).[8]

I believe the remainder of Table XI (relating to groups of country districts) calls for but one remark in this place. The diminished range of death-rates, and higher death-rates for females after age 55 are in some measure attributable to the fact that in the more healthy districts, and the sex which most usually reaches a high age, the component parts making up the total of persons aged 55—65, 65—75, &c., include a higher proportion of persons in the second quinquennium than in those where a heavier mortality is experienced. If the ratios were known for single years of age, the healthy districts would appear to greater advantage, and the unhealthy ones would look worse.

Any closer analysis than is contained in this paper will hardly become useful until means are taken to measure the disturbances occasioned by institutions for the care of the sick and insane, by workhouses, and by migrations; and I go so far as to say that the nation would be a gainer if even such investigations and returns as the case seems to require involved ten times the cost they are likely to lead to.

[8] Largely due to (in some cases I think entirely caused by) migrations.

APPENDIX.

TABLE I.—*Rates of Mortality for the Ten Years* 1881-90

	0—5.		5—15.		15—25.	
	Males.	Females.	Males.	Females.	Males.	Females.
ENGLAND AND WALES	61·69	51·99	4·18	4·22	4·95	4·94
1. London	68·46	59·01	4·29	4·24	4·56	3·86
2. Liverpool	84·27	74·86	6·09	5·82	6·04	5·20
3. Manchester	86·04	73·36	5·91	5·79	6·15	5·49
4. Birmingham	68·16	58·67	3·75	3·74	4·22	4·03
5. Leeds	78·02	65·23	5·27	5·45	5·80	5·15
6. Sheffield	78·55	67·19	5·27	5·34	5·31	5·09
7. Bristol	59·65	48·29	3·90	3·83	4·77	4·33
8. Hull	69·43	57·91	5·34	5·00	5·34	4·94
9. Newcastle-on-Tyne	72·28	62·29	5·40	5·36	6·17	6·26
10. Nottingham	77·33	63·14	4·24	4·24	4·83	5·40
11. Old cities	60·67	52·01	3·85	4·02	5·62	5·12
12. Dockyard towns	64·42	55·07	4·34	4·49	5·50	4·95
13. Twelve towns	62·81	52·88	3·52	3·58	4·93	4·38
14. Seaside pleasure places	48·44	39·29	3·25	3·50	5·35	4·09
15. Inland „	47·75	38·76	3·14	3·38	4·44	3·69
16. Black Country	71·50	60·40	4·05	3·86	4·11	4·37
17. Northern colliery district	67·29	58·19	5·35	5·32	5·84	6·15
18. Yorkshire manufacturing district	68·76	57·23	4·81	4·87	5·40	6·03
19. Lancashire „	76·00	63·16	4·86	4·61	5·44	5·50
20. Barrow-in-Furness	58·40	51·86	4·33	4·47	4·68	5·63
21. South Wales colliery district	68·30	57·54	5·35	5·07	6·13	6·12
22. Cornish mining district	61·06	52·90	3·34	3·68	5·33	5·30
23. Staffordshire potteries	82·59	68·16	4·23	3·98	4·84	5·51
24*a*. Northumberland, &c.	47·45	39·04	3·74	4·03	5·16	5·77
b. Yorkshire	47·80	39·80	3·76	3·98	4·49	5·56
c. Lancashire, &c.	51·67	42·64	3·89	3·76	4·69	4·96
d. Wales, &c.	44·45	36·45	3 91	4·24	5·71	6·06
e. Staffordshire, &c.	47·66	38·98	3·27	3·28	4·19	4·97
f. Leicester, &c.	51·49	42·10	3 61	3·78	4·31	5·38
g. Gloucester, &c.	41·05	33·41	3·16	3·34	4·19	5·05
h. Devon and Cornwall	44·99	36·98	3·43	3·71	4·85	5·05
i. Norfolk, &c.	44·37	35·75	3·22	3·43	4·46	5·34
k. Northampton, &c.	48·80	39·78	3·44	3·60	3·88	4·95
l. Bucks, Oxford, &c.	42·75	35·21	3·16	3·29	3·90	4·52
m. Herts and Essex	42·39	35·13	3·40	3·45	4·27	4·94
n. Kent and Surrey	43·43	36·14	3·28	3·68	4·34	4·48
o. Sussex and Hants	35·77	28·95	2·99	3·20	3·86	4·77
Total—450 districts	45·55	37·36	3·48	3·66	4·53	5·21

APPENDIX.

in the several parts of England and Wales at various Ages.

25—35.		35—45.		45—55.		55—65.		65—75.	
Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
7·73	7·34	12·35	10·55	19·28	15·04	34·66	28·40	70·17	60·08
8·17	6·50	14·00	10·78	22·23	16·28	39·12	29·42	74·38	60·72
10·89	9·82	17·93	15·79	28·45	24·00	50·76	42·51	94·32	80·03
10·54	9·27	18·74	15·12	30·29	23·77	53·19	45·23	101·05	87·04
7·72	7·01	13·66	11·36	21·65	17·36	40·94	32·03	81·63	67·21
7·72	8·11	13·23	11·48	23·34	18·48	45·52	36·96	93·98	77·04
8·42	7·74	14·67	11·69	25·02	17·42	46·79	34·77	94·91	74·13
7·74	6·24	12·35	10·30	19·56	15·08	34·73	26·86	72·25	57·52
7·82	7·90	13·41	11·67	20·40	15·95	37·46	28·12	82·46	61·40
9·04	9·14	14·27	12·79	22·70	18·85	42·92	33·82	86·40	68·62
6·84	8·06	10·77	10·74	17·58	15·77	34·00	30·19	70·38	63·48
9·16	7·79	14·19	11·38	20·87	15·27	37·06	28·16	73·63	59·35
8·58	7·25	13·45	10·55	20·97	15·40	33·37	26·30	66·83	58·15
7·80	6·81	12·42	10·01	18·66	14·40	33·70	27·39	71·30	58·25
8·60	6·19	12·16	8·61	17·29	12·35	28·43	22·58	59·77	49·22
8·15	5·76	12·92	8·84	17·92	13·06	31·41	24·84	68·69	54·64
6·39	6·61	10·47	9·31	18·13	14·44	37·53	29·05	80·48	66·26
6·87	8·69	10·78	11·57	17·47	15·89	35·07	30·54	74·53	66·79
7·49	7·69	12·43	10·49	21·08	15·37	40·66	31·82	85·80	70·89
8·01	8·22	13·44	11·62	23·09	18·38	44·98	38·80	91·44	79·87
5·75	7·40	10·77	12·00	16·25	14·66	33·07	34·12	70·48	68·31
7·85	8·94	12·56	12·01	20·64	15·98	39·88	31·58	76·95	64·22
7·06	6·43	9·45	7·66	17·24	10·06	32·73	21·62	67·48	51·48
7·78	8·77	15·47	12·47	28·60	17·77	50·08	36·46	92·74	77·71
7·12	8·01	10·10	9·81	16·29	13·47	30·83	26·86	68·03	58·64
6·68	7·71	9·63	9·74	14·76	12·49	27·61	24·82	63·85	56·22
6·72	7·20	10·37	10·23	16·50	13·89	32·39	27·28	69·22	62·68
7·99	8·33	9·97	9·87	15·18	12·16	28·97	23·62	63·79	53·34
6·71	7·02	10·66	9·28	15·98	12·30	29·54	24·60	63·48	54·38
6·22	7·14	8·77	8·91	13·00	11·34	25·42	21·59	58·00	50·61
6·65	6·60	9·43	8·65	14·76	12·05	27·65	23·73	60·75	53·58
6·83	6·74	9·43	8·50	13·67	10·90	24·87	21·80	56·91	51·48
6·44	6·81	8·41	8·41	11·85	10·38	22·97	20·03	53·29	46·41
5·62	6·47	8·41	8·19	12·83	10·78	24·68	21·49	59·86	52·97
6·63	6·10	9·67	8·49	14·39	11·84	25·24	22·83	61·23	54·81
6·62	6·42	10·25	8·31	14·62	11·38	26·43	22·17	58·67	51·40
7·18	6·31	11·55	9·24	16·28	12·82	27·21	23·61	57·77	50·89
6·39	6·37	9·70	8·40	14·19	11·05	24·64	21·77	53·94	50·92
6·79	7·05	9·76	9·09	14·64	11·97	27·19	23·30	60·56	53·16

TABLE II.—*Centesimal Ratios of Female Death-Rates at each Age to National Rates.*

	0—	5—	15—	25—	35—	45—	55—	65—
1. London	113·5	100·5	78·1	88·6	102·2	108·3	103·6	101·1
4. Birmingham	112·8	88·6	81·6	95·5	107·7	115·4	112·8	111·9
7. Bristol	92·9	90·8	87·6	85·0	97·6	100·3	94·6	95·7
14. Seaside places	75·6	82·9	82·8	84·3	81·6	82·1	79·5	81·9
15. Inland pleasure places	74·5	80·1	74·7	78·5	83·8	86·9	87·5	90·9
3. Manchester	141·1	137·2	111·1	126·3	143·3	158·0	159·3	144·9
2. Liverpool	144·0	137·9	105·3	133·8	149·7	159·6	149·7	133·2
5. Leeds	125·5	129·1	104·2	110·5	108·8	122·9	130·1	128·2
6. Sheffield	129·2	126·6	103·0	105·4	110·8	115·8	122·4	123·4
10. Nottingham	121·4	100·5	109·3	109·8	101·8	104·9	106·3	105·7
8. Hull	111·4	118·5	100·0	107·6	110·6	106·1	99·0	102·2
11. Old cities	100·0	95·3	103·6	106·1	107·9	101·5	99·2	98·8
12. Dockyard towns	105·9	106·4	100·2	98·8	100·0	102·4	92·6	96·8
9. Newcastle-on-Tyne	119·8	127·0	126·7	124·5	121·2	125·3	119·1	114·2
13. Other 12 towns	101·7	84·8	88·7	92·8	94·9	95·7	96·4	97·0
23. Staffordshire potteries	131·1	94·3	111·5	119·5	118·2	118·2	128·4	129·3
19. Lancashire manufacturing districts	121·5	109·2	111·3	112·0	110·1	122·2	136·6	132·9
16. Black Country	116·2	91·5	88·5	90·1	88·2	96·0	102·3	110·3
17. Northern colliery districts	111·9	126·1	124·5	118·4	109·7	105·6	107·5	111·2
21. South Wales colliery districts	110·7	120·1	123·9	121·8	113·8	106·2	111·2	106·9
18. Yorkshire manufacturing districts	110·1	115·4	122·1	104·8	99·4	102·2	112·0	118·0
20. Barrow-in-Furness	99·7	105·9	114·0	100·8	113·7	97·5	120·1	113·7
22. Cornish mining districts	101·8	87·2	107·3	87·6	72·6	66·9	76·1	85·7
24*c*. Lancashire, &c.	82·0	89·1	100·4	98·1	97·0	92·4	96·1	104·3
a. Northumberland, &c.	75·1	95·5	116·8	109·1	93·0	89·6	94·6	97·6
b. Yorkshire	76·6	94·3	112·6	105·0	92·3	83·0	87·4	93·6
e. Staffordshire, &c.	75·0	77·7	100·6	95·6	88·0	81·8	86·6	90·5
g. Gloucester, &c.	64·2	79·1	102·2	89·9	82·0	80·1	83·6	89·2
d. Wales, &c.	70·1	100·5	122·7	113·5	93·6	80·9	83·2	88·8
n. Kent and Surrey	69·5	87·2	90·7	86·0	87·6	85·2	83·1	84·7
l. Bucks, Oxford, &c.	67·7	78·0	91·5	83·1	80·5	78·7	80·4	91·2
m. Herts and Essex	67·6	81·8	100·0	87·5	78·8	75·7	78·1	85·6
h. Devon and Cornwall	71·1	87·9	102·2	91·8	80·6	72·5	76·8	85·7
o. Sussex and Hants	55·7	75·8	96·6	86·8	79·6	73·5	76·7	84·8
f. Leicester, &c.	81·0	89·6	108·9	97·3	84·5	75·4	76·0	84·2
k. Northampton, &c.	76·5	85·3	100·2	88·2	77·6	71·7	75·7	88·2
i. Norfolk, &c.	68·8	81·3	108·1	92·8	79·7	69·0	70·5	77·2
Total (450 districts)	71·9	86·7	105·5	96·0	86·2	79·6	82·0	88·5

TABLE III.—*Centesimal Ratios of Male Death-Rates at each Age to National Rates.*

	0—	5—	15—	25—	35—	45—	55—	65—
1. London	111·0	102·6	92·1	105·7	113·4	115·3	112·9	106·0
4. Birmingham	110·5	89·7	85·3	99·9	110·6	112·3	118·1	116·3
7. Bristol	96·7	93·3	96·4	100·1	100·0	101·5	100·2	103·0
14. Seaside places	78·5	77·7	108·1	111·3	98·5	89·7	82·0	85·2
15. Inland pleasure places	77·4	75·1	89·7	105·4	104·6	93·0	90·6	97·9
3. Manchester	139·5	141·4	124·2	136·4	151·7	157·1	153·5	144·0
2. Liverpool	136·6	145·7	122·0	140·9	145·2	147·6	146·5	134·4
5. Leeds	126·5	126·1	117·2	99·9	107·1	121·1	131·3	133·9
6. Sheffield	127·3	126·1	107·3	108·9	118·8	129·8	135·0	135·3
10. Nottingham	125·4	101·4	97·6	88·5	87·2	91·2	98·1	100·3
8. Hull	112·5	127·8	107·9	101·2	108·6	105·8	108·1	117·5
11. Old cities	98·3	92·1	113·5	118·5	114·9	108·2	106·9	104·9
12. Dockyard towns	104·4	103·8	111·1	111·0	108·9	108·8	96·3	95·2
9. Newcastle-on-Tyne	117·2	129·2	124·6	117·0	115·5	117·7	123·8	123·1
13. Other 12 towns	101·8	84·2	99·6	100·9	100·6	96·8	97·2	101·6
23. Staffordshire potteries	133·9	101·2	97·8	100·6	125·3	148·3	144·5	132·2
19. Lancashire manufacturing districts	123·2	116·3	109·9	103·6	108·8	119·8	129·8	130·3
16. Black Country	115·9	96·9	83·0	82·7	84·8	94·0	108·3	114·7
17. Northern colliery districts	109·1	128·0	118·0	88·9	87·3	90·6	101·2	106·2
21. South Wales colliery districts	110·7	128·0	123·8	101·6	101·7	107·1	115·1	109·7
18. Yorkshire manufacturing districts	111·4	115·1	109·1	96·9	100·6	109·3	117·3	122·3
20. Barrow-in-Furness	94·7	103·6	94·5	74·4	87·2	84·3	95·4	100·4
22. Cornish mining districts	99·0	79·9	107·7	91·3	76·5	89·4	94·4	96·2
24*c*. Lancashire, &c.	83·8	93·1	94·7	86·9	84·0	85·6	93·5	98·7
a. Northumberland, &c.	76·9	89·5	104·2	92·1	81·8	84·5	88·9	97·0
b. Yorkshire	77·5	90·0	90·7	86·4	78·0	76·6	79·7	91·0
e. Staffordshire, &c.	77·3	78·2	84·6	86·8	86·3	82·9	85·2	90·5
g. Gloucester, &c.	66·6	75·6	84·6	86·0	76·4	76·6	79·8	86·6
d. Wales, &c.	72·1	93·5	115·3	103·4	80·7	78·7	83·6	90·9
n. Kent and Surrey	70·4	78·5	87·7	92·9	93·5	84·4	78·5	82·3
l. Bucks, Oxford, &c.	69·3	75·6	78·8	85·8	78·3	74·6	72·8	87·3
m. Herts and Essex	68·7	81·3	86·3	85·6	83·0	75·8	76·3	83·6
h. Devon and Cornwall	72·9	82·1	98·0	88·4	76·4	70·9	71·8	81·1
o. Sussex and Hants	58·0	71·5	78·0	82·7	78·5	73·6	71·1	76·9
f. Leicester, &c.	83·5	86·4	87·1	80·5	71·0	67·4	73·3	82·7
k. Northampton, &c.	79·1	82·3	78·4	72·7	68·1	66·5	71·2	85·3
i. Norfolk, &c.	71·9	77·0	90·1	83·3	68·1	61·5	66·3	75·9
Total (450 districts)	73·8	83·3	91·5	87·8	79·0	75·9	78·4	86·3

TABLE IV.—*Rates of Mortality amongst Males in* (1) *the several Parts of London,* (2) *the Several Groups of Healthy Districts.*

	Age.						
	0—	5—	15—	25—	35—	45—	55—
London, Western	66·12	4·10	4·41	8·05	13·98	22·05	38·84
,, Northern	62·96	4·20	4·44	7·98	13·65	22·14	39·05
,, Southern	65·01	3·69	3·82	6·73	11·96	19·29	35·76
,, Eastern	74·84	4·75	5·10	9·13	15·17	24·07	42·06
,, Central	89·84	5·59	5·04	10·35	18·31	27·96	37·32
,, Woolwich	51·86	4·40	5·85	8·27	12·50	17·95	32·50
Districts with low infant mortality.							
12 in North (with Wales)	31·60	3·00	4·69	7·85	8·68	13·13	24·97
17 ,, South	32·90	2·78	3·84	5·62	8·38	13·14	22·99
8 ,, West	32·08	2·44	3·38	5·91	7·55	11·04	25·10
Districts with low mortality age 55—65.							
19 in North (with Wales)	41·60	3·47	4·78	6·47	8·19	11·73	22·97
33 ,, East	43·85	3·21	4·24	5·81	7·71	11·00	21·15
9 ,, West	40·06	3·26	4·54	5·95	8·24	12·25	22·61
21 ,, South	38·59	3·18	3·88	5·85	8·40	12·72	21·80
Total (119 districts)	39·42	3·15	4·20	6·03	8·12	12·00	22·33

Note.—The healthy districts consist of—

12 in North.—Leyburn, Bellingham, Belford, Glendale, West Ward, Meriden, Weobly, Ellesmere, Church Stretton, Tenbury, Tregaron, and Aberayron.

17 in South.—Hambledon, Dorking, Romney Marsh, Petworth, Thakeham, Westbourne, Ticehurst, Uckfield, East Grinstead, Midhurst, Lymington, Ringwood, New Forest, Catherington, Stockbridge, Alresford, and Droxford.

8 in West.—Wilton, Warminster, Tisbury, Dulverton, Wheatenhurst, Tetbury, Northleach, and Winchcomb.

19 in North.—Lunesdale, Thorne, Howden, Patrington, Skirlaugh, Driffield, Bridlington, Stokesley, Bromyard, Clun, Droitwich, Stratford-on-Avon, Shipston-on-Stour, Southam, Llandovery, Newcastle-in-Emlyn, Lampeter, Knighton, and Rhayader.

33 in East.—Market Harborough, Blaby, Oakham, Spalding, Sleaford, Southwell, Bingham, Hardingstone, Oundle, Huntingdon, St. Neots, Woburn, Caxton, North Witchford, Whittlesey, Hoxne, Bosmere, Plomesgate, Blything, Flegg, Smallburgh, Aylsham, St. Faith's, Forehoe, Henstead, Depwade, Guiltcross, Wayland, Walsingham, Docking, Freebridge Lynn, Downham, and Swaffham.

9 in West.—Thornbury, Westbury, Axminster, Okehampton, Crediton, Holsworthy, Stratton, Launceston, and St. Columb.

21 in South.—Royston, Amersham, Buckingham, Henley, Thame, Chipping Norton, Epping, Ongar, Chelmsford, Maldon, Tendring, Chertsey, Hoo, West Ashford, East Ashford, Blean, Hailsham, Cuckfield, Westhampnett, Havant, and Kingsclere.

TABLE V.—*Centesimal Ratios of Male Death-Rates at each Age to National Rates for London Divisions and Healthy Districts.*

	0—5	5—15	15—25	25—35	35—45	45—55	5—65
London, Western	107·2	98·1	89·1	104·1	113·2	114·4	112·1
„ Northern	102·1	100·5	89·7	103·2	110·5	114·8	112·7
„ Southern	105·4	88·3	77·2	87·1	96·8	100·1	103·2
„ Eastern	121·3	113·6	103·0	118·1	122·8	124·8	121·4
„ Central	145·6	133·7	101·8	133·9	148·3	145·0	107·7
„ Woolwich	84·1	105·3	118·2	107·0	101·2	93·1	93·8
Districts with low infant mortality.							
12 in North (with Wales)	51·2	71·8	94·7	101·6	70·3	68·1	72·0
17 „ South	53·3	66·5	77·6	72·7	67·9	68·2	66·3
8 „ West	52·0	58·4	68·3	76·5	61·1	57·3	72·4
Districts with low mortality. Age 55—65.							
19 in North (with Wales)	67·4	83·0	96·6	83·7	66·3	60·8	66·3
33 „ East.....	71·1	76·8	85·7	75·2	62·4	57·0	61·0
9 „ West	64·9	78·0	91·7	77·0	66·7	63·5	65·2
21 „ South	62·6	76·1	78·4	75·7	68·0	66·0	62·9
Total (119 districts)	63·9	75·4	84·8	78·0	65·7	62·2	64·4

TABLE VI.—*Age* 0—5. *Death-Rates per* 1,000 *in* 450 *Registration Districts.*

	Number of Registration Districts.	Males.							Females.						
		Under 30.	30—35.	35—40.	40—45.	45—50.	50—55.	55 and upwards.	Under 25.	25—30.	30—35.	35—40.	40—45.	45—50.	50 and upwards.
Northumberland, &c...	24	3	1	5	10	1	2	2	3	4	8	5	1	3	—
Yorkshire	36	1	4	9	5	6	8	3	1	4	11	9	7	4	—
Lancashire, &c.....	18	—	—	2	4	5	3	4	—	—	5	4	5	3	1
Wales, Salop, &c.....	61	2	2	17	22	11	6	1	3	9	23	19	5	2	—
Stafford, &c.....	28	—	7	4	3	3	6	5	1	5	5	6	7	4	—
Leicester, &c.	32	—	—	6	7	6	6	7	—	2	10	6	6	5	3
Gloucester, &c.	56	4	11	18	14	8	1	—	3	20	20	10	3	—	—
Devon and Cornwall...	22	—	1	6	5	5	4	1	—	—	9	7	4	—	2
Norfolk, &c.....	44	—	2	11	17	6	7	1	—	1	25	10	7	1	—
Northampton, &c.	20	—	—	4	6	6	2	2	—	1	4	11	3	—	1
Bucks, &c.	26	—	2	10	7	5	2	—	—	1	16	7	2	—	—
Herts and Essex	23	—	2	7	8	4	1	1	—	4	9	8	1	1	—
Kent and Surrey	27	—	4	10	3	4	4	2	1	9	6	3	6	1	1
Sussex and Hants	33	4	12	15	2	—	—	—	5	17	8	2	1	—	—
	450	14	8	124	113	70	52	29	17	77	159	107	58	24	8

TABLE VII.—*Age* 45—55. *Death-Rates per* 1,000 *in* 450 *Registration Districts.*

	Number of Registration Districts.	Males.							Females.						
		Under 10.	10—12.	12—14.	14—16.	16—18.	18—20.	20 and upwards.	Under 8.	8—10.	10—12.	12—14.	14—16.	16—18.	18 and upwards.
Northumberland, &c...	24	1	1	6	7	5	2	2	—	—	10	6	6	2	—
Yorkshire	36	3	11	8	6	6	—	2	—	5	18	9	2	—	2
Lancashire, &c.....	18	1	1	2	4	7	1	2	—	—	4	7	5	1	1
Wales, Salop, &c.....	61	5	4	21	19	6	4	2	2	11	25	17	4	1	1
Stafford, &c.	28	—	6	8	5	1	6	2	—	5	13	6	2	2	—
Leicester, &c.	32	2	11	11	6	—	2	—	1	7	15	8	1	—	—
Gloucester, &c.....	56	3	11	15	18	4	1	4	—	8	28	14	2	4	—
Devon and Cornwall...	22	2	6	7	5	2	—	—	1	5	11	4	1	—	—
Norfolk, &c.	44	10	19	10	—	2	1	2	2	20	16	4	1	1	—
Northampton, &c.....	20	3	8	5	3	—	1	—	1	9	6	4	—	—	—
Bucks, &c.	26	2	2	14	4	—	2	2	—	3	13	8	2	—	—
Herts and Essex	23	—	5	6	9	1	—	2	1	6	10	4	—	1	1
Kent and Surrey	27	1	3	6	8	4	1	4	1	3	10	8	3	1	1
Sussex and Hants	33	1	7	10	11	3	—	1	1	12	12	6	—	2	—
	450	34	95	129	105	41	21	25	10	94	191	105	29	15	6

TABLE VIII.—*Age* 55—65. *Death-Rates per* 1,000 *in* 450 *Registration Districts.*

	Number of Registration Districts.	Males.							Females.					
		Under 20.	20—24.	24—28.	28—32.	32—36.	36—40.	40 and upwards.	Under 18.	18—21.	21—24.	24—27.	28—32.	32 and upwards.
Northumberland, &c.	24	—	5	4	9	3	1	2	1	1	7	10	4	1
Yorkshire	36	2	8	16	6	2	—	2	—	9	12	11	2	2
Lancashire, &c.	18	—	—	5	5	6	2	—	1	—	3	8	5	1
Wales, Salop, &c.	61	3	11	24	12	10	1	—	2	11	31	14	3	—
Stafford, &c.	28	—	7	8	7	4	2	—	2	6	8	7	4	1
Leicester, &c.	32	1	16	8	5	2	—	—	1	14	14	3	—	—
Gloucester, &c.	56	—	15	24	9	7	1	—	—	13	22	16	4	1
Devon and Cornwall	22	3	8	9	2	—	—	—	2	6	9	4	—	1
Norfolk, &c.	44	11	19	10	2	1	1	—	7	25	9	1	2	—
Northampton, &c.	20	—	11	7	2	—	—	—	1	11	5	3	—	—
Bucks, &c.	26	1	11	12	—	1	1	—	1	8	10	7	—	—
Herts and Essex	23	2	5	10	4	—	—	2	3	9	7	2	—	2
Kent and Surrey	27	3	10	5	4	3	2	—	3	6	12	3	1	2
Sussex and Hants	33	3	18	8	2	1	1	—	2	13	13	5	—	—
	450	29	144	150	69	40	12	6	26	132	162	94	25	11

TABLE IX.—*Age* 65—75. *Death-Rates per* 1,000 *in* 450 *Registration Districts.*

	Number of Registration Districts.	Males.							Females.						
		Under 50.	50—53.	53—60.	60—65.	65—68.	68—70.	70 and upwards.	Under 42.	42—45.	45—53.	53—56.	56—60.	60—63.	63 and upwards.
Northumberland, &c..	24	1	1	5	6	1	1	9	—	—	5	6	6	2	5
Yorkshire	36	1	1	12	11	5	2	4	—	3	12	8	6	—	7
Lancashire, &c.....	18	2	—	2	1	2	2	9	—	—	1	2	2	3	10
Wales, Salop, &c.....	61	3	4	27	9	7	3	8	3	4	28	12	8	4	2
Stafford, &c.....	28	1	2	7	10	2	—	6	1	1	10	5	8	—	3
Leicester, &c.	32	2	5	13	8	2	1	1	1	5	18	3	5	—	—
Gloucester, &c.....	56	2	6	21	15	7	—	5	—	2	22	13	11	6	2
Devon and Cornwall...	22	3	1	12	6	—	—	—	—	—	12	4	5	—	1
Norfolk, &c.....	44	14	7	19	1	1	—	2	8	10	23	1	—	1	1
Northampton, &c.....	20	—	2	12	3	1	1	1	—	2	9	5	2	2	—
Bucks, &c.....	26	—	3	15	2	2	1	3	—	—	8	7	5	4	2
Herts and Essex	23	1	2	12	5	1	—	2	—	2	17	—	2	—	2
Kent and Surrey	27	3	4	13	4	1	—	2	1	2	18	4	—	—	2
Sussex and Hants	33	11	6	11	5	—	—	—	1	3	21	5	2	—	1
	450	44	44	181	86	32	11	52	15	34	204	75	62	22	38

TABLE X.—*Showing the Mortality at certain Ages in* 103 *Registration Districts* (*part of the* 450 *Districts treated as Country Districts*), *in which the Mortality at one or more of those Ages was high.*

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
a. 21 *Districts.**								
Mansfield	62·86	12·15	29·25	68·15	53·37	13·11	23·92	57·09
Barrow-on-Soar	62·07	14·06	26·15	62·24	51·36	10·72	24·77	52·31
Loughborough	61·39	13·31	30·80	57·86	49·57	12·95	23·67	56·49
Strood	60·81	14·34	31·31	52·31	46·69	10·47	22·99	54·27
Hinckley	60·73	12·79	23·57	56·22	48·54	12·53	22·82	55·56
Nuneaton	60·62	11·47	23·17	57·84	44·48	11·15	24·71	48·73
Caistor	59·34	14·18	28·70	57·51	50·08	13·16	22·72	55·48
Falmouth	59·28	15·22	23·98	64·19	51·56	10·71	20·39	45·63
Stone	57·99	18·91	30·84	59·79	44·11	14·24	27·90	53·43
Foleshill	57·74	13·94	25·20	56·23	48·09	9·67	23·74	49·01
Kettering	56·81	13·06	23·14	59·13	44·84	9·58	21·02	50·87
Tadcaster	56·56	13·07	26·20	61·73	44·89	11·43	22·31	55·85
Goole	56·55	15·84	30·62	65·83	47·07	13·44	23·99	55·36
Wellington (Salop)	56·28	12·85	32·57	63·13	45·95	10·82	23·30	53·19
Orsett	55·13	12·42	28·07	53·85	47·40	12·08	20·95	45·58
Guisbrough	55·08	13·33	25·71	61·17	43·49	10·80	25·33	49·91
Kidderminster	54·40	19·53	33·03	64·47	45·27	12·61	25·86	54·35
Gainsborough	53·48	13·33	23·24	56·95	48·01	10·49	19·58	50·07
Thorne	51·50	9·38	20·19	55·71	45·89	11·33	19·34	48·87
Hemsworth	50·32	16·30	24·72	66·67	48·32	8·93	24·12	59·80
Scilly Isles	33·06	11·36	21·43	63·49	51·40	12·37	34·57	67·57
b. 10 *Districts.*†								
Whitehaven	58·11	20·58	43·41	83·78	47·97	17·55	33·14	69·81
Wrexham	54·58	18·76	35·76	84·09	46·49	15·35	30·41	66·36
Newcastle-under-Lyme	60·09	18·59	35·61	83·06	46·47	16·12	31·47	69·49
Chesterfield	59·86	15·59	32·95	71·96	49·63	13·50	28·32	66·21
Fylde	59·03	16·71	32·95	72·70	48·66	14·10	26·71	63·01
Northwich	56·03	14·15	32·69	68·91	45·70	14·11	28·19	67·77
Gravesend	60·06	21·17	32·59	66·30	52·14	15·63	26·00	51·39
Cockermouth	58·42	19·51	32·50	77·29	49·76	14·19	30·15	65·01
Leek	56·73	15·88	29·90	70·38	46·07	13·89	29·42	64·67
Luton	66·88	15·94	27·79	70·00	55·20	13·23	25·14	61·22
c. 8 *Districts.*‡								
Alston	38·12	26·53	43·38	87·14	26·42	16·59	26·51	73·96
Weardale	47·70	18·50	38·60	81·82	39·49	15·75	28·02	66·55
Chapel-en-le-Frith	43·01	20·00	33·71	80·36	39·08	16·44	33·48	65·65

* These districts show a high rate of infantile mortality, but at high ages a less conspicuous excess, and no hospitals are within them.

† With mortality high both in infancy and later. No hospitals.

‡ With no hospitals, but rather high mortality after 45.

TABLE X, *Contd.—Showing the Mortality at certain Ages in* 103 *Registration Districts*

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
c 8 *Districts*—contd.†								
Reeth	32·76	20·56	48·36	77·11	26·48	20·11	23·45	59·09
Ormskirk	52·25	19·70	37·89	74·24	44·26	14·52	27·17	61·15
Shepton Mallet	40·91	18·07	28·49	62·75	29·38	10·31	24·16	48·71
Cheadle (Staff.)	50·38	18·52	30·62	61·73	39·62	11·78	28·30	55·77
Cardigan	36·39	18·18	24·44	58·27	29·62	11·57	21·70	50·41
d. 26 *Districts*.‡								
Holywell	44·08	15·72	35·32	82·34	38·38	12·83	28·02	61·15
Clitheroe	48·99	16·77	29·74	76·00	39·47	15·55	31·73	70·68
Berwick	42·43	14·98	30·92	75·96	38·26	12·27	26·34	57·75
Haltwhistle	36·07	13·53	29·32	75·18	32·80	15·20	28·85	61·54
Llanelly	52·73	15·01	28·79	72·27	41·42	12·93	24·78	58·11
Skipton	53·34	16·53	31·60	72·21	43·31	15·47	31·03	67·53
Pontardawe	45·22	15·90	32·42	72·04	39·12	11·55	21·09	55·73
Congleton	52·43	15·17	31·85	71·28	43·13	13·77	26·56	67·28
Altrincham	45·50	16·13	33·84	71·27	36·02	12·98	27·05	62·82
Alnwick	44·74	17·21	31·45	71·16	37·44	11·47	24·90	53·07
Marlborough	40·39	15·32	23·08	71·13	30·74	10·72	23·67	64·47
Darlington	50·28	15·35	30·42	70·96	42·73	12·50	25·74	57·97
Carnarvon	52·85	16·11	33·57	70·78	43·72	13·62	23·95	59·56
Westbury-on-Severn	47·94	14·21	33·02	70·52	36·89	10·39	20·00	52·81
Yeovil	44·75	16·09	32·06	70·19	34·21	12·71	20·82	56·97
Bakewell	41·35	17·20	31·20	68·48	32·36	12·81	27·16	64·55
Nantwich	51·47	15·32	27·52	66·90	42·99	13·69	28·70	64·18
Oswestry	41·26	16·17	32·34	66·55	34·49	12·59	22·32	64·88
Andover	32·34	16·62	26·38	64·88	32·18	11·68	23·56	63·09
Pickering	47·60	15·42	24·30	64·50	36·01	13·30	25·63	64·81
Settle	37·70	14·13	26·55	62·84	36·82	12·68	27·79	63·30
Richmond (Yorkshire)	37·95	11·51	27·96	61·92	31·79	11·01	21·30	63·75
Pateley Bridge	42·12	11·72	29·25	60·61	34·44	11·40	32·75	65·24
Winslow (Bucks)	47·24	9·52	21·86	59·72	33·83	9·09	23·57	64·29
Rhayader	43·37	9·79	27·10	59·15	30·86	16·30	17·65	46·67
Pewsey	38·59	12·50	25·11	53·28	31·98	16·21	24·39	58·38
e. 31 *Districts*.§								
Wortley	53·54	24·35	41·25	90·97	46·88	18·08	33·86	69·78
Headington	50·05	20·64	37·77	85·94	40·41	14·88	27·41	62·67
Godstone	33·82	21·85	39·36	84·13	27·93	16·59	35·23	75·19
Watford	44·51	24·28	41·38	81·52	36·31	17·10	33·57	69·54
Windsor*	45·21	19·72	33·52	79·66	37·38	13·26	26·69	59·32

† With no hospitals, but rather high mortality after 45.

‡ With no hospitals; mortality high at 65—75, but not so high at 45—55.

§ All these districts contain institutions such as county lunatic asylums, hospitals for the sick, homes for imbeciles. Those which contain only hospitals are marked with a *.

TABLE X, *Contd.—Showing the Mortality at certain Ages in* 103 *Registration Districts.*

	Death-rates (Males).				Death-rates (Females).			
	0—5.	45—55.	55—65.	65—75.	0—5.	45—55.	55—65.	65—75.
e. 31 *Districts*—contd.†								
Atcham (Shrewsbury)	46·61	20·36	36·00	79·00	38·48	15·17	26·07	60·36
Lancaster	61·22	24·02	39·97	78·13	52·76	19·45	30·72	64·77
Lichfield	44·50	18·78	34·13	75·44	37·43	15·44	27·45	58·40
Billericay	44·03	28·48	40·38	74·57	34·92	18·43	34·71	64·92
St. Asaph	44·22	22·44	34·78	74·15	35·27	18·15	30·92	61·38
Stafford	45·90	23·88	39·17	73·96	42·27	17·02	33·11	64·20
Bury St. Edmunds*	53·89	20·10	39·29	73·65	44·55	12·39	25·89	63·38
Burton-on-Trent	50·73	19·04	35·89	73·60	40·04	13·23	28·19	58·06
Hereford	44·03	18·67	34·66	73·38	39·45	12·63	24·01	56·39
Gloucester	49·72	20·78	36·35	73·13	40·31	16·77	29·23	61·63
Epsom	39·47	27·36	37·61	73·13	34·09	20·61	36·51	65·80
Blofield	44·73	20·85	27·79	71·71	36·42	17·46	28·80	61·52
Wells (Somerset)	39·76	21·53	35·65	71·68	34·95	16·53	29·15	61·61
Upton-on-Severn	38·25	23·54	36·35	71·34	31·27	11·62	24·61	54·56
Lincoln	61·10	18·57	33·48	70·32	47·73	13·67	24·31	59·99
Biggleswade	50·15	18·47	29·57	68·78	39·53	13·82	26·65	60·88
Wallingford	34·76	19·23	27·79	68·54	31·98	15·39	24·03	57·58
Devizes	33·57	22·00	33·33	65·66	26·72	14·07	30·90	64·04
Alderbury (Salisbury)	41·15	22·47	33·33	65·58	30·65	16·80	32·37	60·03
Carmarthen	43·15	18·59	34·04	63·76	34·95	14·17	26·93	53·07
Fareham	41·22	26·42	36·57	60·84	32·23	17·67	25·50	59·20
Billesdon	48·90	18·26	34·52	60·63	40·19	14·29	20·47	55·26
Guildford	39·89	22·18	33·14	59·93	31·70	15·06	25·96	55·29
Easthampstead	36·14	20·31	26·76	59·07	30·40	10·13	20·65	48·39
Bridge	38·34	19·76	35·73	57·31	28·41	14·98	30·63	51·18
Woodbridge	40·65	18·20	29·68	52·66	33·24	14·40	19·44	49·55
f. 7 *Districts.*‡								
Belper	49·69	16·49	35·62	74·84	41·68	14·32	27·53	63·69
Wharfedale	53·81	16·96	32·14	74·00	42·85	13·94	29·81	71·14
Aylesbury	48·36	13·81	27·82	72·66	36·84	13·71	26·19	63·28
Morpeth	54·01	16·63	30·56	71·72	46·34	15·62	30·51	67·58
King's Lynn*	61·90	16·49	35·79	65·26	48·90	12·51	29·63	52·45
Lewes	38·89	17·86	32·37	64·71	31·21	16·49	26·67	55·16
Blaby*	61·36	9·37	20·52	56·19	47·11	10·95	22·98	48·58

†. All these districts contain institutions such as county lunatic asylums, hospitals for the sick, homes for imbeciles. Those which contain only hospitals are marked with a *.

‡ These districts contain similar institutions to the last; in them the male mortality at age 45—55 is not so high.

TABLE XI.—*Centesimal Ratios of Female Death-Rates less or more than Male Ratios. Refer to* TABLES II *and* III.

	0—5.	5—15.	15—25.	25—35.	35—45.	45—55.	55—65.	65—75.
London	+2·5	−2·1	−14·0	−17·1	−11·2	− 7·0	− 9·3	− 4·9
Birmingham	+2·3	−1·1	− 3·7	− 4·4	− 2·9	+ 3·1	− 5·3	− 4·4
Bristol	−3·8	−2·5	− 8·8	−15·1	− 2·4	− 1·2	− 5·6	− 7·3
Seaside places	−2·9	+5·2	−25·3	−27·0	−16·9	− 7·6	− 2·5	− 3·3
Inland pleasure places	−2·9	+5·0	−15·0	−26·9	−20·8	− 6·1	− 3·1	− 7·0
Manchester	+1·6	−4·2	−13·1	−10·1	− 8·4	+ 0·9	+ 5·8	+ 0·9
Liverpool	+7·4	−7·8	−16·7	− 7·1	+ 4·5	+12·0	+ 3·2	− 1·2
Leeds	−1·0	+3·0	−13·0	+10·6	+ 1·7	+ 1·8	− 1·2	− 5·7
Sheffield	+1·9	+0·5	− 4·3	− 3·5	− 8·0	−14·0	−12·6	−11·9
Hull	−1·1	−9·3	− 7·9	+ 6·4	+ 2·0	+ 0·3	− 9·1	−15·3
Nottingham	−4·0	−0·9	+11·7	+21·3	+14·6	+13·7	+ 8·2	+ 5·4
Old cities	+1·7	+3·2	− 9·9	−12·4	− 7·0	− 6·7	− 7·7	− 6·1
Dockyard towns	+1·5	+2·6	−10·9	−12·2	− 8·9	− 6·4	− 3·7	+ 1·6
Other 12 towns	−0·1	+0·6	−10·9	− 8·1	− 5·7	− 1·1	− 0·8	− 4·5
Newcastle-on-Tyne	+2·6	−2·2	+ 2·1	+ 7·5	+ 5·7	+ 7·6	− 4·7	− 8·9
Staffordshire potteries	−2·8	−6·9	+13·7	+18·9	− 7·1	−30·1	−16·1	− 2·9
Lancashire manufacturing districts	−1·7	−7·1	+ 1·4	+ 8·4	+ 1·3	+ 2·4	+ 6·8	+ 2·6
Yorkshire manufacturing districts	−1·3	+0·3	+13·0	+ 7·9	− 1·2	− 7·1	− 5·3	− 4·3
Black Country	+0·3	−5·4	+ 5·5	+ 7·4	+ 3·4	+ 2·0	− 6·0	− 4·4
Northern colliery districts	+2·8	−1·9	+ 6·5	+29·5	+22·4	+15·0	+ 6·3	+ 5·0
South Wales „ „	—	−7·9	+ 0·1	+20·2	+12·1	− 0·7	− 3·9	− 2·8
Barrow-in-Furness	+5·0	+2·3	+19·5	+26·4	+26·5	+13·2	+24·7	+13·3
Cornish mining districts	+2·8	+7·3	− 0·4	− 3·7	− 3·9	−22·5	−18·3	−10·5
Lancashire, &c.	−1·8	−4·0	+ 5·7	+11·2	+12·8	+ 6·8	+ 2·6	+ 5·6
Yorkshire	−0·9	+4·3	+21·9	+18·6	+14·3	+ 6·4	+ 7·7	+ 2·6
Northumberland, &c.	−1·8	+6·0	+12·6	+17·0	+11·2	+ 5·1	+ 5·7	+ 0·6
Wales, &c.	−2·0	+7·0	+ 7·4	+10·1	+12·9	+ 2·2	− 0·4	− 2·1
Staffordshire, &c.	−2·3	−0·5	+16·0	+ 8·8	+ 1·7	− 1·1	+ 1·4	—
Gloucester, &c.	−2·4	+3·5	+17·6	+ 3·9	+ 5·6	+ 3·5	+ 3·8	+ 2·6
Kent and Surrey	−0·9	+8·7	+ 3·0	− 6·9	− 5·9	+ 0·8	+ 4·6	+ 2·4
Bucks, Oxford, &c.	−1·6	+2·4	+12·7	− 2·7	+ 2·2	+ 4·1	+ 7·6	+ 3·9
Herts and Essex	−1·1	+0·5	+13·7	+ 1·9	− 4·2	− 0·1	+ 1·8	+ 2·0
Devon and Cornwall	−1·8	+5·8	+ 4·2	+ 3·4	+ 4·2	+ 1·6	+ 5·0	+ 4·6
Sussex and Hants	−2·3	+4·3	+18·6	+ 4·1	+ 1·1	− 0·1	+ 5·6	+ 7·9
Leicester, &c.	−2·5	+3·2	+21·8	+16·8	+13·5	+ 8·0	+ 2·7	+ 1·5
Northampton, &c.	−2·6	+3·0	+21·8	+15·5	+ 9·5	+ 5·2	+ 4·5	+ 2·9
Norfolk, &c.	−3·1	+4·3	+18·0	+ 9·5	+11·6	+ 7·5	+ 4·2	+ 1·3

Discussion *on* Mr. T. A. Welton's Paper.

Mr. Noel A. Humphreys said that as long ago as 1874 he had himself read a paper before the Society on the "Value of Death-Rates as a Test of Sanitary Condition," to which Mr. Welton had replied in the following year by a paper on the "Effect of Migrations upon Death-Rates," in which the subject now brought forward had been discussed. After the remarks Mr. Welton had made, he felt that the Department in which he had served so many years was rather on its defence. There could be no doubt that the immigration of healthy lives from country districts to towns affected very favourably the mortality in towns at the ages mentioned, viz., from 15 to 25 for males, and from 15 to 35 for females, at the expense of the country districts. This migration must unduly raise the mortality in the country and unduly depress it in the towns. Dr. William Farr, formerly President of their Society, very frequently referred to this migration into towns in his reports. He pointed out that the deleterious effect of residence in towns was masked to some extent by this migration; that there were undoubtedly a certain number of these healthy country migrants, domestic servants, shop assistants, and the like, who, after a few years of town residence, under the influence of failing health returned to the country, and in some cases died there. But when Mr. Welton pointed out that in his opinion the Registrar-General's Department had not done what it could in calculating the precise effect of this disturbing influence and correcting for it, it was his (Mr. Humphreys') duty to point out that the Department would be very glad if it were possible to carry out the suggestion, but they had no power under the present registration statutes to ask all sorts of questions of persons who came to register a death. Even if such legislation were passed, their troubles as statisticians would in his opinion only begin. How were they to determine what residence in a town was of sufficient length to justify them in transferring the death from the country to the town? In the case of a domestic servant who spent four or five years in service in London, a healthy woman possibly when she went up, and who returned to her country home and afterwards died of phthisis at the age of 25, was her death to be transferred from the country to the town, when out of the 25 years of her life she had lived 20 or 21 in the country and only 4 or 5 in town? It would be quite impossible to frame instructions for deciding whether the residence in town had caused the phthisis or whether the disease was hereditary. In the paper he read before the Society in 1874, he threw out merely as a counter theory to Mr. Welton's the suggestion that domestic servants in London who came up from village homes might actually, by being better fed and better clothed, enjoy better health than in their country homes, where they were possibly under-fed and irregularly supported. He had never seen any doubt expressed that that might in part be the explanation of the statistics referred to by Mr. Welton. Anyway, he could not see how any useful correction could be made. So called corrections

and adjustments of statistics were very useful up to a certain point, but statisticians should be very certain of their ground before attempting to tamper with their figures—for that was what correction really meant. Mr. Welton had not mentioned an enormous amount of correction which had been undertaken in the present volume of the "Decennial Supplement," and which must commend itself to every one. The Registrar-General's Department had undertaken the enormous labour of correcting the mortality in each of the 650 districts for males and females separately, and for every county in England, for the disturbance caused by the varying proportions of sex and age. These corrections were of very great importance, and brought out more clearly than ever before the clear necessity, which medical officers of health would be the first to recognise, for correcting for the age and sex proportions of a population before arriving at any just estimate of the relation between the death-rate and the sanitary condition of the district. With regard to deaths in institutions, Mr. Welton had pointed out that these disturbed the local death-rates. But it was only since 1882 that they had obtained the power of requiring previous residence to be inserted in the register of deaths of this kind. In the London sanitary districts that distribution was now completely undertaken, but the exigencies of the office staff prevented this distribution being fully carried out elsewhere. One reform which he personally would like to see carried out was the substitution of the sanitary for the registration district as the unit for local statistics; but here again the office staff was at present inadequate. Fifty years ago the registration district might have been a satisfactory unit, but the creation and growth of an enormous number of urban sanitary districts rendered it, in his opinion, distinctly desirable, if not absolutely necessary, to adopt the sanitary district as the statistical unit in the reports and tables issued by the Registrar-General.

Mr. E. L. Walford thought they would all be convinced after hearing Mr. Welton's very able paper, that for the purpose of comparison the rates of mortality were absolutely useless. He had been convinced of that for many years, and had come to the conclusion that the only system by which they could be utilised was to form a sort of index number for each district, based on the characteristic and disturbing elements of the population. His plan was briefly this: for each registration district to obtain from the decennial census returns the following facts carefully noted:—

1. The percentage of females to males.
2. The percentage of female servants.
3. The percentage of women not born in the district employed as clerks or in business.
4. The percentage of children residing in schools. This was a very disturbing element in a place like Brighton. If an epidemic broke out the children were sent off home while the disease was in course of incubation, and the deaths in fatal cases would appear in a perfectly different district to that in which the epidemic broke out.

5. The percentage of unmarried people over 50.
6. The percentage of persons of independent means.
7. The percentage of those who made a living by letting lodgings, which would give an idea of the fluctuation of the population caused by visitors. All these seven ratios should be combined into one result, and he would then take the admissions into hospitals per head of the population, the percentage of population living in various institutions in the district, and the birth-rate. He would then multiply the last three together and divide the result of the first seven by that of the last three, and the quotient should then be multiplied by the poor-rate. By that means a sort of index number would be obtained which when multiplied by the annual death-rate would be very useful for purposes of comparison. At present the actual mortality was absolutely useless owing to the disturbing elements. Thus if in the case of two towns they knew that in one 20 per cent. of the population were domestic servants, and in another 40 per cent., while the death-rate was the same in both, they would be quite certain that the one with 40 per cent. of domestic servants would be a much less healthy town than the one with 20 per cent.

Mr. A. H. Bailey could not altogether follow Mr. Welton, especially as he understood that the object of his paper was to use the rates of mortality in different districts as a test to indicate the relative healthiness of those districts. He appreciated very much the time and labour Mr. Welton had spent in getting out his results, but having had some experience in these investigations, he was satisfied that the statement of ages in the returns of the Registrar-General could not be depended upon. Dr. Farr, so well known as a past President of their Society, in the supplement to one of the earlier reports of the Registrar-General, published the table of mortality known as the English Life Table. That was deduced from the records of deaths and the numbers living at different ages as disclosed by the census, and Dr. Farr was obliged to admit that the accuracy of the returns made by the female population, especially at certain periods of life, could not be relied upon. Those who had studied the law of mortality of the two sexes, knew that the general results were that the average duration of life at all ages was greater for women than for men. The mortality of children under 5 was greater among males than females. During the child-bearing period of life the rate of mortality among women was greater than among men, but after a certain period, say 55, the mortality of males was so much greater that it more than counteracted the rate of mortality among females at the child-bearing period. In Mr. Welton's first table on p. 36, where the rates of mortality for England and Wales were given, it was shown that the rate of mortality was always greater for males than for females, except from the ages of 5 to 15, and 15 to 25, where they were almost identical. This statement might be compared with other observations made amongst assured lives, where in every case the age had to be proved, and amongst the families of the peerage, as was done some years ago by

himself and Mr. Day, after they had satisfied themselves that the statements in the peerage books might be relied upon. From 15 to 25, Mr. Welton's statement showed that the death-rate per 1,000 living was 4·95 for males, and 4·94 for females, practically the same. Amongst assured lives, the corresponding figures were 7·5 and 11·6, and amongst the peerage families 8·8 and 7·8, that is to say, the mortality of males was materially greater. Taking another instance from 35 to 45, the mortality of males was put down in Mr. Welton's tables at 12·3 per 1,000, the females 10·5. Amongst assured lives the numbers were 10·1 and 12·5, and amongst peerage families 9·8 and 11·0, the results for the sexes being thus reversed. How was it possible then to take the returns of ages as given in the Registrar-General's report as accurate? What they wanted was not more detailed, but more accurate information.

Mr. Frederick Hendriks said it seemed to him that the question before them involved certain insoluble problems, and it was utterly hopeless to look for any mathematical method of comparison between different cities in England, much more between cities situated in different countries. He had been present at several discussions on this question abroad, and foreign statisticians found these difficulties staring them in the face. It was impossible practically to compare the figures relating to the cities of one country with those relating to another, as there were so many radical differences in the age distribution of their populations. At the same time there had been an effort made abroad in the very direction Mr. Walford had brought forward, viz., to establish something like an index number. At a meeting abroad, which was largely attended by gentlemen who held posts similar in some respects to that held by Mr. Humphreys, it was suggested that, for international comparison at any rate, if they got at the mortality of the inhabitants of the cities of Sweden, where the system of registration was rather more perfect than in other countries, that would form a very good index number both for male and female life. There might be something in that suggestion, but he feared the difficulties of correcting the present returns were insuperable. They could not be got over without they adopted lines of inquiry, which, although very attractive on paper, would be found utterly impracticable in practice. At the same time the existing returns in England, crude as they were, were of great value to enable comparisons to be made for the same places from year to year, and it would be a great public loss if they were in any way discontinued. He was not sanguine, however, of any scheme for their amelioration to any considerable extent at present.

Mr. G. H. Perris thought this was an exceedingly serious matter, and one to which the Council should give their constant attention. If there were any promise in any scheme in the nature of an index number it should be encouraged. Having spent, or he supposed he must now say wasted, several years over a comparison of the vital statistics of towns, in the great working class

districts especially, he felt rather acutely on the matter, and thought that everything possible should be done to secure the adoption of a system of statistics which the student could safely use. There were one or two points in the paper to which he might advert. The author asked how the high death-rate in the town of Newcastle-on-Tyne for both sexes above middle life, as compared with the neighbouring colliery districts, could be accounted for; but surely the two phenomena were complementary, the low deaths in the colliery districts and the high deaths in the city, which was also a seaport, being two sides of the same fact. The colliery districts naturally attracted the physically fit, whilst those old and physically unfit naturally tended to settle down in a big port and town. As to Staffordshire, he had a clear recollection that Dr. Reid, the very able medical officer of health for that county, attributed the high death-rate at certain ages to the labour of the women in the potteries and factories. He would like to suggest that the Society might attempt to perfect the collection of medical officers' reports in the Library.

Dr. Shirley Murphy fully agreed with Mr. Humphreys that the great thing in making improvements in statistics was to aim at what was practicable. It seemed to him that the Registrar-General had made such a large advance with regard to the distribution of institution deaths in London, that he was led to hope that by degrees the same system could be extended all over the country. They knew how very largely and increasingly persons suffering from infectious disease, for instance, were removed from the districts in which they resided and carried to hospitals outside those districts; and unless the deaths were returned to those districts to which they properly belonged, the statistics of such districts were less accurate than could be wished. This was already done for many towns. No doubt these were all questions of expense, of sufficient staff, and so on, and it certainly behoved the Society to use any influence it might have to induce the Treasury to behave liberally to the department of the Registrar-General.

The Chairman (Dr. G. B. Longstaff) said he proposed to make a few remarks before proposing a vote of thanks to the author, and, if they were somewhat of a critical nature, he hoped they would not be looked upon as unfriendly. Several points suggested themselves for consideration: for example, he noted that the seaside watering places included Ilfracombe and the Barnstaple district. He was happy to say he knew that was a healthy district; but it was stretching a point to call it a watering place. The season was extremely short, the watering places were all small, and the agricultural population was very large, and any inferences which might be drawn from the Barnstaple district should, in his opinion, be put down to the influences of agricultural life, rather than to its being a health resort. Then a criticism was made that the census was unfair to health resorts owing to the time of year at which it was taken. In opposition to that, he should venture to suggest that the visitors who went to a health

resort produced directly but a very trifling effect on its mortality. The great majority of them were in good health, and practically did not die at those places. Therefore, if the census was taken at a time when they were full of visitors, it would be unfair, in the other way, by giving a population that was not prone to death. There was another matter already connected with that, which should be borne in mind. Great care was required in drawing inferences as to death-rates at those ages of life when the rate was very low, because in a limited district a very small number of deaths which might arise almost from accident or from coincidence would very materially affect the death-rate at those ages; whereas at the two extremes of life, when the number of deaths was large, accidental occurrences did not affect the rate in the same degree. The same criticism as he had made with regard to visitors also applied to boarding schools. Practically speaking, boarding schools were filled by children of the better class, and the mortality was as near *nil* as possible. A considerable number of the children were sent home if they were ill, and the number of deaths in any case in such schools was very small. He was inclined to think the interesting figures Mr. Bailey had given them were subject to a fallacy of another kind. Assured lives were to a great extent socially selected lives, and therefore, if they were compared with lives of all kinds, a comparison would be made between a general population and a selected one possessing certain social advantages. Assured lives were not only selected first from a medical point of view, but were also all of a special class. For instance, Mr. Bailey showed that the mortality at the child-bearing age was greater in assured lives than in those belonging to the peerage; but were not the latter the very class of women who one might very well suppose would go through the troubles of child-bearing with greater risk than the lower classes?

On p. 59 the author said, "If we venture to assume," &c.; but no reason whatever was given for such an assumption. It was to be regretted that the author did not dwell rather more on his diagram, which was very interesting and instructive. Of course the exact correspondence in an inverse sense of the two curves in that diagram was not so remarkable as might at first sight appear, because, practically, a whole population had been taken, and the deaths of each half considered separately. If one half went up the other half would go down; and the diagram really showed that for limited periods the country districts were exactly the complement of London. A similar curve might probably be obtained for other large towns.

Having spent a considerable time over the paper, he ventured to express an opinion that the figures were not presented in the most suitable form. He did not blame Mr. Welton, because it was the conventional form, but he thought, with the doubts they had in their minds about all these matters, especially when talking of the accuracy of the returns, to go into decimals at all was a mistake, and certainly to go beyond the first place. The method which Mr. Welton had pursued of comparing the proportion per cent. of the death-rates to the average death-rate of the whole

country was very valuable, because it was much easier to follow, and it showed at once what the differences were; but they had not the full advantage of it because of the decimals. In working out statistics, whether done mechanically or by logarithms, there were many reasons in favour of carrying the calculations to the second place of decimals, but, having got the results out, he was of opinion that the best thing anybody could do before putting them before the public was to scratch out the decimals altogether, of course, making the proper allowance on the last unit. Then he ventured to think that another improvement might be effected. If the author indicated in some way by a + or — or by differences of type in his tables, those figures which were notably above or below the average, it would make them much clearer. The easiest difference to take was that of 10 per cent., which could be obtained by a very simple arithmetical process. For instance, Mr. Welton, said on p. 45 that, of the great towns, the first six were decidedly much more unhealthy than the others; he then went on to certain others, but, having marked these tables in the way he had spoken of, he (Dr. Longstaff) found that not the first six but the first eight were so markedly more unhealthy that they exhibited a death-rate at least 10 per cent. higher at every age and for both sexes.

He would conclude by moving a cordial vote of thanks to Mr. Welton, because there was no doubt that this paper was the fruit of a great deal of labour, and had given rise to an interesting discussion.

Mr. Welton, in reply, said that with regard to Mr. Humphreys's observations, he did not contend that the Registrar-General's department was entitled to correct the statistics on hypothetical grounds; but he thought that, after due inquiry, the department might be able to state that the death-rates, at all events between the ages of 15 and 35, were absolutely misleading, and rendered any comparison of the mortality of different districts at those ages impossible. If Dr. Tatham's report had pointed out not only that this transference of deaths from one district to another took place, but also that it very much affected the particular ages, as much would have been done as was possible. With regard to local inquiries, they could best be prosecuted in country districts, where the local doctor and clergyman would know everything about the persons who were ill and died. In these parishes information could easily be obtained respecting the deaths of those who had been away and had returned after losing their health, at all events between the ages he had mentioned. The corrections made by the department in relation to the age constitution of population were of great value, but he was disappointed that they had not gone a step further, and introduced an equally necessary correction based upon the proper distribution of deaths in institutions, such as workhouses, asylums, and hospitals. Mr. Bailey had rightly drawn attention to the unreliability of the census returns of ages. He had himself some years ago prepared a paper to measure roughly the amount of inaccuracies in the returns, and was able to do so with fair success by comparing successive censuses and calculating

the intervening loss of population by death, and making allowance for the collective effect of emigration and immigration. The figures as they stood led to a preposterous result, but with a moderate correction he found the whole matter could be reconciled. He found that as to those returned under the age of 5 the figure was always too small, because there were always some children returned as 5 who had not really reached that age, and probably none were returned as under 5 who had really reached that age. At the age 20—25 the figure for females was invariably too large for a double reason : first, there were always a certain number of girls of the working class who, being tall and well grown, were able to add a year or two to their ages and get higher wages accordingly. That applied also to young men. On the other hand, there were a great number of ladies who fell into that period because they did not wish to rise above 25. The ages from 25 to 30 were depleted by those who chose to be younger, but invaded by a still larger number who would not exceed 30. And so it went on until after 40, when the pendulum began to lose its swing, and by the time 60 was reached there was very little inaccuracy at all. After 70 there was, however, a distinct tendency to overstate the age. In spite of all this inaccuracy, he thought that the extent of mis-statement would not be great enough to weigh much against the enormous local differences which did exist.

Mr. Hendriks seemed to think but little of the value of the Registrar-General's tables or of those now presented, but he would like to recall to his recollection certain tables and information placed before the Privy Council long ago, by Dr. Greenhow, with respect to the local causes of death. Having co-operated with him in the preparation of his statistics, he might say that the facts disclosed induced the authorities to employ him several times afterwards to go down to places where there was a remarkable mortality, and investigate and report; and he believed to such labours as these a great deal more good was to be attributed than the general public were aware of. The chairman had remarked that at watering places visitors did not die, and there was much truth in that, but besides visitors who went for pleasure, there were a great many with broken health who went to the sea-side and died there. As to the tendency to fluctuation that affected small death-rates, he entirely agreed with the chairman, and had joined together the ages of 5—15, and 15—25, partly for that very reason. Still, he would say that the study of any single registration district was of no use, and he had consequently broken up the 450 districts into groups of 20, 30, 40, and 50, which gave results harmonising with one another sufficiently to be of great value, in his opinion. He appreciated what had been said as to the desirability of keeping this whole subject well to the fore, and thought that, as long as the department took the liberty of making corrections for the constitution of the population in their decennial volume at all events, though not in their annual report, they might also take the liberty of correcting the ratios in any other way which, after full consideration, appeared to be in the interests of truth.

Silver Prices *in* India. *By* Fred. J. Atkinson, F.S.S.

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I.—*Introductory.*

The extraordinary fall in Gold prices led to the preparation by several economists of figures detailing the course that prices had taken annually for many years back. This course was indicated by so-called "Index Numbers," a method which is universally admitted to be the clearest and most satisfactory, and the figures which are now best known are those published by Mr. Augustus Sauerbeck. No attempt has however hitherto been made to deal with the course of Silver prices. The consequence is that various contradictory statements have been made on the subject at different times, and the general impression prevails, probably based on the declared values of exports from India, that Silver prices have been practically stable for the past twenty-five years, and the inference drawn is that Silver as a measure of value possesses qualities of stability which Gold is declared not to possess. It is with the object of coming to some definite conclusion on the point that the present figures have been worked out with considerable difficulty, and whether the conclusions arrived at hereafter are agreed to or not, the figures themselves will, it is hoped, prove useful to economists generally.

This paper deals only with Silver prices in India, it would

perhaps be more accurate to say "Rupee Prices in India," but the Rupee price represented the Silver price up to the year 1893, and it seems probable that up to that time India practically fixed Silver prices throughout the world. Since 1893, the year in which the mints were closed, the Rupee and Silver have diverged, and the prices given are Rupee prices.

II.—*Method of Procedure.*

The only attempts apparently hitherto made to ascertain the general course of Silver prices in India have been by taking the declared values of exports of merchandise, giving them index numbers, and treating the result as a correct statement of facts. The result by this simple method indicates that Silver prices have been practically stable for the past twenty-five years, the variations up to 1891 not having exceeded about 9 per cent. But a little inquiry will show that this method is not to be relied on. In the first place, it is well known that exporters are never very careful to give correct figures, and there is always a tendency to give the declared value as approximate to the previous declaration as possible; secondly, it is doubtful if the figures of the customs department of values declared were in former years quite accurate; thirdly, certain of the exports, such as tea, opium, and indigo, are articles of considerable importance in the exports of the country, and are accordingly given due prominence in assigning index numbers to exports, whereas they are of little or nearly no importance in the inland trade of the country, which is the trade with which Silver prices are concerned; and lastly, the published figures of values necessarily lump together the values of every class of the same description of goods, and to ascertain the real prices of each variety of the same description of any particular export is impossible. Some more accurate method of arriving at actual results is therefore necessary, and no safer guide than the principles of the method of procedure adopted by Mr. Sauerbeck can be followed.

But whilst adopting Mr. Sauerbeck's principles, it is necessary to inquire whether his method in its entirety is altogether suitable to India. Mr. Sauerbeck in his index numbers of Gold prices bases his figures on 33 different classes of commodities, all of which are imported into England. Of these, wheat is represented by three different qualities and three index numbers; beef, mutton, pork, sugar, iron, coals, cotton, wool, hides, and oil by two each, and the remainder by one each, thus bringing up the total heads dealt with to 45. The majority of the prices are taken in London. Mr. Sauerbeck makes no attempt to deal with each article in actual proportion to its relative importance as

compared with other articles, beyond assigning more than one index number to the more important, but this, though in the right direction, gives only a rough approximation as regards relative importance.

The method adopted is, however, no doubt quite suitable to Gold prices, because London fixes the Gold price of all commodities, and the rise and fall in the price of any particular commodity of any importance ordinarily reacts, sooner or later, on other commodities, all other conditions remaining the same, and the necessity for differentiating between the various articles according to their relative importance is perhaps of little consequence. In fact, Mr. Sauerbeck's figures probably give as accurate a result of the articles dealt with, *i.e.*, articles of import, as could possibly be arrived at.

It is doubtful, however, if this method would be altogether suitable for India, as the conditions and circumstances of the country are so entirely different from those of England. India for economic purposes may be said to represent a cluster of different countries, each with its own products, its own differences in habits, its own climate, its own meteorological conditions, and its own prices, and this diversity was considerably more prevalent before railways began to thread their way throughout the vast empire.

The great bulk of the population is agricultural, and the Native of the country is a very curious creature in regard to his economic conditions. His earnings are small, but the cost of his living is less; the greater part of his income, received sometimes in coin but often in grain, is consumed in food, his clothing is of the scantiest description, and probably ordinarily does not reach the value of a Rupee a head per annum, and his luxuries are small, sometimes *nil*. The house in which he lives is possibly built by himself, and he pays rent, a very small one, only for his holding. If he manages to put by any money, he usually turns it into an ornament to be worn by some female member of his family, and the inducement to invest his savings in this manner formerly was, that he could always turn the ornament into money again should the necessity arise. This, although the mints are now closed, he can still do, though less profitably than before, since Silver bullion is still in demand, and has its market price. Occasionally he buries his savings as a safeguard against future bad times. He rarely, if ever, deposits money with a bank, and the buried money is ordinarily rather in the nature of a deposit than "hoarding" as the term is generally accepted.

India is entirely self-contained, and the vast bulk of the trade results from the productions of the country, on which

the imports represent only some 7 per cent. If we examine the exports too, we find that certain of them, a considerable portion, are produced mainly for the purpose of export, and but little used by the Natives of the country, and the total exports, including these heads, are only about 9 per cent. of the value of the production. It seems evident therefore that prices must necessarily be affected rather by the production in common use than either by imports or exports, though the latter might affect prices to a limited extent, a point which will be touched on hereafter.

As already stated, the production and prices vary so greatly in different parts of the country, that to take only one market, Calcutta or Bombay, and treat every article as of equal or nearly equal importance, would give a very inaccurate idea of the actual state of affairs. To avoid this, a statement (Appendix A) has been prepared, based on the Agricultural Returns and Financial and Commercial Statistics, published by the government of India, and the Administration Reports of the various Native States. The year 1893-94 has been taken, the last year for which complete tables have been published. The figures for India and Mysore are believed to be approximately accurate, but the figures for the Native States are, with the exception of a few products, estimated from such slight information on the subject as is obtainable from the Administration Reports. The figures may, however, be accepted as sufficiently accurate for the purpose for which the statement is prepared. The figures given in the third section are also only approximate, and, so far as the industries are concerned, are shown below their value, as figures are not published in all cases, and it is impossible to estimate the enormous hand industries which are carried on in almost every village in India. The statement includes all the food supply of India of any importance, with the exception of fruit and vegetables, for which it seems practically impossible to obtain any reliable figures.

Col. 2 of the statement gives the statistical result required, namely, the percentage each product bears to the whole; in other words, the relative importance of each. This gives a sufficiently accurate basis on which to build, and Col. 12 of the statement shows the percentage of the whole that has been taken for each commodity in preparing the range of prices.

It may incidentally be mentioned that 1893 was a peculiarly prosperous year. Not only was the area cultivated greater than in any previous year, but the average yield per acre was above the normal. This was practically common to all products, and the fact that the year was a prosperous one does not therefore vitiate the accuracy of the relative importance of each article.

It would perhaps be more accurate if a similar statement had been prepared for every year dealt with, and the proportion of each product fixed accordingly; but even if this were possible it would have involved an immense amount of perhaps unnecessary labour, and as a matter of fact the figures of acreage under cultivation and production are only available for a comparatively few years back. The proportion of each product given in the statement may however be accepted as fairly representing the proportion produced each year for many years, perhaps with the exception of wheat. The great increase in the export of wheat naturally led to its greater cultivation, but this took place only in recent years, and the modification in the production of this grain probably does not interfere materially with the accuracy of the general results.

Looking at Col. 11 of the Statement, it will be seen that the production of Rice is shown as $34\frac{1}{2}$ per cent. of the whole, including Section III. It has therefore been thought necessary to take 30 per cent. as the percentage of the articles dealt with, and so with every other article a proportion has been taken tallying as near as possible with its actual importance. In Section III, however, it will be noted that the proportions taken are greater than those shown in Col. 11, but this is partly necessary in order to include the items, and, as already stated, the figures given are in many cases below the actual value.

Next, accepting the fact that India in its economic conditions represents a cluster of different countries, we have to consider in what particular markets the prices of the various articles should be taken. To ascertain this, Appendix B has been prepared. This statement gives the area of cultivation in 1893-94 of each product in each province of India; and the price of each product has, as far as possible, been taken in the province or provinces in which the area of cultivation is greatest. This of course cannot be done in all cases, more especially in the Native States, the figures for which are only obtainable in a few cases, and are not always reliable.

III.—*Commodities Selected.*

Appendices A and B give the percentage of each article to the whole, and the importance of each province in the growth of each product; it is now intended to consider the articles selected, but only those will be touched on for which any special notice appears necessary.

One hundred articles in all have been taken, it being possible with this number to include all for which figures are obtainable, whilst at the same time not giving the minor articles undue importance. The prices taken have been obtained from various

sources, partly from the prices current which the Chambers of Commerce of Calcutta, Bombay, and Madras issue; partly from the publication, "Prices and Wages of India," issued by the government of India, and partly from private sources. A few only, when figures were not elsewhere obtainable, have been taken from the export accounts.

Rice.—This of course is the most important of all products, it is the staple food of an enormous population, and even when not the staple food, it is still eaten to some extent by the great majority. It is chiefly grown in Bengal, though a considerable quantity is also raised in the North-West Provinces, Burma, and Madras, the Burma production being to a large extent exported. As the grain is so largely grown throughout the country, and the markets for it are so enormous, it has been thought expedient to take averages of prices at as many places as possible within the principal regions of its production. With this object various markets have been grouped together in one division, whilst certain important centres such as Calcutta, Patna, and Jubbulpore have been shown separately. Bengal has been allotted six index numbers, representing eighteen markets; Madras two numbers, representing six markets; North-West Provinces two numbers, eleven markets; Burma two numbers, five markets; Central Provinces two numbers, two markets; and Hyderabad, Deccan, one number, one market, aggregating in all fifteen index numbers and forty-three markets. This, however, does not give the required proportion of 30 per cent., consequently the whole of the fifteen index numbers have been grouped together and added to the list, or, in other words, each of the index numbers given has practically been doubled, thus making thirty numbers, representing the prices at forty-three different markets. The figures given are those published in the volume of "Prices and Wages," and from prices kindly supplied by Messrs. Ralli Brothers.

Wheat, the second most important product of India, is represented by five numbers, three of common wheat, one of first quality, and one in the shape of flour. The prices of the common wheat have been taken at the three great centres of Cawnpore, Delhi, and Nagpur.

Other grains.—This head in the agricultural returns includes a large number of different classes of minor grains and pulses grown in different parts of the country, though the North-West Provinces are pre-eminent in their cultivation. It has only been found possible to obtain reliable figures for a few, and the figures for some of these are not complete. *Arhar* (*cajanus indicus*), the most important of these minor pulses, for which two index numbers have been given, and *Mung* (*phaseolus mungo*), give

complete figures. Those for *Masúr* (*erva lens*) and *Chenna* (*cicer arietinum*), supplied by the Commissariat Department, commence only from 1875, and are averages of the financial year. It has unfortunately not been found possible to obtain figures for any other of the many grains or pulses under this head, and consequently only 5 per cent. instead of $9\frac{1}{2}$ per cent. has been taken.

Sugar.—The two refined sugars have been taken from the Calcutta prices current, assisted by figures kindly supplied by Messrs. Bissouath, Law, and Company, and the two raw sugars from the Madras prices current. Considerable difficulty was experienced in the former case, as indeed in most of the quotations taken from the prices current, by the changes in nomenclature during the series of years, which in some cases meant a change in actual quality, and to continue the same quality throughout the entire period involved a method of calculation of comparisons. The result, however, is probably approximately accurate.

Ginger, Tea, and Coffee, are taken from the export accounts, as reliable figures were not obtainable elsewhere.

Cotton, of which three descriptions have been taken, are all obtained from the Bombay prices current.

Jute, Indigo, Linseed, Rape, Saltpetre, Raw Silk (Surdales), Raw Buffalo and Cow Hides, Raw Goat Skins, Gunny Bags, Silk Piece Goods, Shellac, Castor Oil, and *Rangoon Teak* have been taken from the Calcutta prices current.

Coal from figures kindly supplied by the Bengal Coal Company.

Opium from the monthly figures published by the Government of India.

Til, Cutch, Castor Seeds, Myrabolams and *Manure* (animal bones), from the export accounts, as reliable figures were not obtainable elsewhere.

Bamboos, an item of some importance in India, on account of its enormous cultivation and the general use it is put to, and *Cocoanut Oil*, are taken from the figures published in the Government of India publication "Prices and Wages." The prices on 1st January of each year beginning from 1871 only are given. Monthly prices for the series of years were not obtainable in either case.

Cotton Yarn and T cloth 44 inches are taken from "Prices and "Wages," and represent the prices, as given to the Government of India by the Bombay Mill Owners' Association, on 1st January and July of each year. The secretary of the association was asked to give monthly figures for the purposes of this paper, but declined assistance. Certain cotton mills also were requested to assist, but all refused. The figures entered, though not giving the actual

average monthly prices, give the general tendency, and an approximately accurate result.

Tanned Hides, and Goat and Sheep Skins have been taken from the Madras Prices Current.

IV.—*The Index Numbers.*

The prices have been taken from the year 1861, the earliest, year from which reliable figures are obtainable, and in each case the price of the year 1871 has been taken to represent the number 100. This year was selected because in that year the index number of Mr. Sauerbeck's Gold prices was 100, and silver approximated to it (99·7), and it is thus possible to make a start, whether taken in relation to Gold, or in relation to Silver, of the three from almost the same point. Appendix C gives the result under each article in each year. Immediately under the heading of each article is given the average price in 1871, which in every case represents 100, and from this price all the other index numbers have been found. In the last line is given the average index number for the whole thirty-five years of each article.

This appendix is summarised in the following statement, which gives the index numbers for (1) Food, (2) Raw Produce and Materials, and (3) Manufactures or partly Manufactured. The fifth column gives the index numbers for all the articles dealt with. Rupee prices and Silver prices were practically the same up to the year 1893, when the Indian Mints were closed to the free coinage of silver; Col. 6 gives the index numbers of Rupee prices in their relation to Silver from that year, and Col. 7 the index numbers of Rupee prices in their relation to Gold; *i.e.*, allowing for the fluctuations in the relative values of gold and the rupee in each year dealt with. This column is a necessity, in order to bring Rupee prices into line with Gold prices for purposes of comparison.

Col. 8 gives similar figures for the Food section of the prices.

Col. 9 gives Mr. Sauerbeck's index numbers for Gold commodities, Col. 10 the Gold price of Silver, and Col. 11 the Gold price of the Rupee.

1 Year.	2 Index Number in relation to the Rupee, *Food.*	3 Index Number, Raw Produce, &c.	4 Index Number, Manufactories, &c.	5 Total Index Number in relation to Rupee.	6 Index Number in relation to Silver.	7 Index Number in relation to Gold.	8 Index Number of *Food* (Col. 2) in relation to Gold.	9 Gold Price Commodities.	10 Gold Price Silver.	11 Gold Price Rupee.
1861....	105	87	93	99	99	98·9	104·9	98	99·9	—
'62....	100	99	96	99	99	99·9	100·9	101	100·9	—
'63....	102	111	99	104	104	105·1	103·1	103	101·1	—
'64....	114	113	100	112	112	113·0	115·0	105	100·9	—
'65....	128	100	93	117	117	117·4	128·4	101	100·3	—
'66....	153	102	94	133	133	113·7	153·8	102	100·5	—
'67....	145	96	91	126	126	125·6	143·6	100	99·7	—
'68....	126	98	90	114	114	113·5	125·5	99	99·6	—
'69....	142	104	89	126	126	125·5	141·4	98	99·6	—
1870....	122	104	100	115	115	114·5	121·5	96	99·6	—
'71....	100	100	100	100	100	99·7	99·7	100	99·7	—
'72...	106	104	99	105	105	104·1	105·1	109	99·2	—
'73...	112	100	94	107	107	104·2	109·1	111	97·4	—
'74....	125	104	99	116	116	111·1	119·8	102	95·8	—
'75....	108	97	94	103	103	96·0	100·8	96	93·3	—
'76....	115	99	83	107	107	92·8	99·7	95	86·7	—
'77....	166	103	85	138	138	124·5	149·7	94	90·2	—
'78....	181	103	87	148	148	127·9	156·4	87	86·4	—
'79....	160	105	89	135	135	113·7	134·7	83	84·2	—
1880....	126	109	97	117	117	100·5	108 2	88	85·9	—
'81....	109	104	96	106	106	90·1	92·6	85	85·0	—
'82....	109	101	91	105	105	89·1	92·5	84	84·9	—
'83....	112	101	91	106	106	88·1	93·1	82	83·1	—
'84....	125	101	86	114	114	95·0	104·1	76	83·3	—
'85....	125	99	80	113	113	90·3	99·9	72	79·9	—
'86....	120	100	85	110	110	82·1	89·5	69	74·6	—
'87....	120	102	90	111	111	81·4	88·0	68	73·3	—
'88....	130	107	94	119	119	83·8	91·5	70	70·4	—
'89....	136	112	102	125	125	87·8	95·5	72	70·2	—
1890....	138	109	96	125	125	98·0	108·2	72	78·4	—
'91....	144	107	94	128	127	94·2	106 0	72	74·3	73·6
'92 ...	161	116	97	141	141	92·1	105·1	68	65·5	65·3
'93....	153	118	106	138	151	88·6	98·2	68	58·5	64·2
'94....	141	119	109	131	158	75·3	81·1	63	47·7	57·5
'95....	132	126	111	128	149	72·8	75·1	62	49·0	56·9

Reference should now be made to Appendices G and H. Appendix G is a diagram tracing the course of Gold and Rupee prices from 1861 to 1895; the thick line A at 100 represents Gold in regard to the course of Gold prices (line B), and the Rupee in regard to the course of Rupee prices (line C). Line D represents the course of the prices of Food products in relation to the Rupee. In Appendix H the thick line A, = 100, represents Gold only, line B Gold prices, line C Silver (metal), line E the Rupee, and line D Rupee prices in their relation to Gold.

V.—*The Course of Prices.*

First dealing with Appendix G, we find that Gold prices remained fairly steady from 1861 to 1871, the fluctuations being 9 points only, but Silver prices were very unsteady, the fluctuations amounting to 34 points. This appears to indicate that during this period, before the demonetization of silver, gold was a more stable measure of value than silver.

From 1871 to 1873 Gold prices rose 11 points and Silver prices 7, then Gold prices commenced a steady fall, dropping 28 points by 1879, whilst during the same period Silver prices, less steady, rose 9 points, fell 13, rose again 45, and fell 13, the gross fluctuation between 1873 and 1879 having been 45 points.

Gold prices then rose 5 points in 1880, whilst Silver prices fell 18. From 1880 to 1887 Gold prices steadily fell 20 points, whilst Silver prices fell, then rose, then fell, then rose again, the highest and lowest fluctuations differing by 12 points.

From 1887 to 1891 Gold prices rose 4 points, whilst Silver prices rose 17.

From 1891 to 1895 Gold prices fell 10 points, and Silver prices rose 13, and fell 13.

Thus, summarising the whole, we find the fluctuations of each as follows :—

	Gold Prices.	Rupee Prices.
	points.	points.
1861–71	9	34
'71–73	11	7
'73–79	28	45
'79–80	5	18
'80–87	20	12
'87–91	4	17
'91–95	10	13
Total	87	146

By putting it in another way, between 1871 and 1895 Gold prices fluctuated 15 points upwards and 58 downwards, whilst Silver prices fluctuated 101 points upwards and 73 downwards.

Thus it will be seen that the fluctuations in Rupee prices were very much greater, both before and after the demonetization of silver, than the fluctuations in Gold prices, and line C in the diagram readily shows this, and also the violent fluctuations to which Rupee prices were subjected. This appears to dispel the idea prevalent in some quarters of the suitability of silver as a measure of value in preference to gold, an idea due to the

common impression regarding the imaginary stability of Silver or Rupee prices. Another factor of great importance apparent in the diagram is the unquestionable tendency to a rise in price, in other words the depreciation of silver in respect to Silver prices. This is equally the case even if we put aside the exceptional years 1877-78-79. This point will be referred to later on when discussing the question of the causes of the fluctuations.

Line D in this diagram representing the course of prices of Food Products shows that the most important commodities, so far as the vast bulk of the people of the country is concerned, fluctuated in price to a much greater extent than the general level of prices did.

Next considering Appendix H, in which Rupee prices are measured in gold, we find that the fluctuations in Rupee prices previous to 1871 were very heavy, whilst Gold prices remained practically steady. Between 1871 and 1876, Gold and Rupee prices moved together. In 1877, Gold prices continued their downward fall, but Silver prices sprang up 35 points.

In 1881 Rupee prices stood at 90, whilst Gold prices and Silver (and Rupee) both stood at 85. From this year to 1895 the tendency of Rupee prices was to follow the downward career of silver, and the rupee, though the movements were not identical, and Gold prices followed the same course.

If, however, we add together the index numbers from 1881 to 1892, the year previous to the closing of the Indian mints, we find the total for Gold prices to be 890, whilst the total for Rupee prices is 1072, thus Gold prices show 310 points from the par of gold, whilst Rupee prices show 128 points, indicating that the general fall in Rupee prices converted into their gold value at the exchange of the day was less than one half (41 per cent.) of the fall in Gold prices. But what perhaps is more important is the position of Silver prices in respect to the gold and silver lines, and the inferences to be drawn therefrom. From the year 1871 down to 1892 we find that the aggregate of index numbers of Silver prices measured in gold was 53·5 points short of par, and during the same period silver was 358·3 points short of par; the average index numbers for the twenty-two years therefore of the three were—

Gold	100·0
Silver prices	97·5
Silver	83·7

In other words, whilst Gold and Silver prices nearly averaged par for the period, gold having appreciated only 2½ per cent., silver depreciated some 14 per cent., and the inference to be

drawn is rather that, as regards gold and silver, the latter depreciated than that the former appreciated.

It may be urged that in the years 1877, 1878, and 1879 there were special reasons for the high Silver prices; if therefore we treat those years as normal years, *i.e.*, giving each the same index number as in 1876, the position would be—

Gold	100
Silver prices	94
Silver	84

making gold to have appreciated 6 per cent., and silver to have depreciated 10 per cent.

VI.—*Causes of the Fluctuations in Rupee Prices.*

These causes may be assigned to the following:—

(*a.*) The rainfall.
(*b.*) The extension of railways.
(*c.*) Excess of demand over supply caused by increase in exports.
(*d.*) Competition outside India.
(*e.*) The condition of the currency.

(*a.*)—*The Rainfall.*

In England, if a severe drought or flooding takes place, prices need not very materially be affected, because England depends to so great an extent on outside supplies, and a drought to England does not necessarily mean the same elsewhere. If any of England's outside markets, such as the United States, has a short crop, prices rise, but, provided the deficiency in the out-turn is not general in all countries, only slightly, because other countries fill the place and supply the full demand. But in India it is a very different matter, because the country being self-contained depends on itself for its food supplies; and to make matters more difficult, the communications in the interior are not as perfect as they should be, and it has sometimes been found almost impossible, without great delay, inconvenience, and expense, to supply grain and food in places where it was really necessary, for want of these means of communication. Both railways and roads are of course improved every year, and deficiencies in rainfall can now be made up in many places by irrigation works, which also increase in extent annually. When the country receives only a short rainfall, especially if the deficiency is general throughout India, a rare occurrence, crops give only a short yield, the supply is not sufficient to meet the demand, prices rise, and this rise in the

tracts where the crops are poorest is often very great. To meet this the proper course would appear to be to import grain to meet the demand, but, strangely enough, such a thing has never been done until the present year, and unfortunately the out-turn in food grains of the whole world during 1896 appears to have been below the normal, a fact which places the present experiment at a disadvantage; nevertheless the attempt now made proves the existence, under ordinary circumstances, of a further safeguard in the future against famine and high prices.

A deficiency in the rainfall in India often causes prices to rise considerably higher than the circumstances of the case necessitate, because the possession and sale of the grain is in the hands of a certain class of men who derive a large profit by holding back their stocks and demanding high prices, and they obviously put this into practice if there is the smallest excuse for doing so with any chance of success. Thus the extent of the deficiency of the rainfall is not always a safe guide to the extent to which prices would be expected to rise, but the general principle may be accepted that a short rainfall, whether it actually lessens the out-turn or not, so long as it raises a panic in that direction, does affect prices.

In dealing with this question, however, it must be remembered that the Natives of India, so peculiar in many of their economic conditions, extend their peculiarity to the particular class of food which they will eat. Conservatives of an ultra type in every respect, a Native accustomed to eat wheat will not eat rice, and will almost starve first; so with a Native who eats ragi, he looks down on wheat or rice as something beneath his notice; so with other grains. This adds to the difficulty of dealing with famines, especially if the grain commonly consumed in any part affected by famine is one which is grown but little anywhere except locally.

Appendix D gives the actual rainfall in India from 1861 to 1895. India is divided into twenty-two meteorological divisions (excluding Upper Burma), each of which contains a number of stations, which have continued to increase gradually almost year by year. In 1861 the twenty-two divisions contained 97 stations, 290 in 1878, and 375 in 1890. The rainfall for each division is taken from the average of all the stations within the division, and as it has been found impossible to adhere to one set of stations throughout the period, the averages given are not strictly accurate as regards comparison of years; but as rain in India is ordinarily general throughout certain areas, the averages may be accepted as approximately correct. The figures (in inches) were kindly supplied by the head of the Meteorological Department in Bengal.

In drawing out the figures for all India, the divisions have been grouped together into ten groups, giving each approximately its share of importance in the rainfall over the cultivated area of the country. In order to do this it has been necessary to omit altogether the two divisions of Gujrat, Sindh, and Cutch, but the area covered by these is of no importance when considering the cultivated area of the country. It has also been necessary to omit the one division including Orissa and the Northern Circars, a the rainfall is very different from the rest of Bengal; the area is small, and to include the figures in the rest of Bengal would give the small cultivated area undue importance, and an incorrect result in the statistics of that province.

Col. 2 of this appendix gives the cultivated area of each group for which the average is given. From these figures two index numbers are taken for Bengal and Assam, two for the Native States, and one for each of the other provinces. It will be noted that Lower Burma has been given undue importance in proportion to its cultivated area, but this it will be observed was unavoidable. The rainfall in inches has been added together for each group for the thirty-five years, and an average struck. This average is shown in Col. 3, and is taken to represent 100. The index numbers of all the groups have then been added together, and the average of the ten groups struck gives the average for all India. In working out these figures the Carnatic and Malabar Coasts of Madras have been grouped as one, but as the rainfall of the two and the cultivation is different, figures have also been separately given below the general average for the more important Carnatic Coast and Mysore district. The figures for Sindh and Gujrat grouped into one are also separately given, as well as figures for the omitted Orissa division.

From the figures for all India it appears that a marked deficiency (*i.e.*, upwards of 10 per cent.) of rain occurred only in the years 1864, 1868, 1873, and 1876, the years 1870, 1882, and 1884 were normal, and 1892, 1893, and 1894 had abundance of rain, *i.e.*, upwards of 10 per cent. in excess of normal. The year 1869, though recording 3 per cent. below the normal, shows the most even distribution of rain of any year. The table brings to light how very even the rainfall in India, taking it as a whole and year by year, has been. The greatest deficiency, 1868, is only 19 per cent. below normal, and if India had then been blessed with a sufficient length of railways and other communications, it is possible that the distress caused by the deficiency of rain in those years would not have been so great as it was. But taking circumstances as they stood, we find serious deficiencies in certain years, which must have caused distress locally and raised prices,

whilst abundance of rain fell in other places in the same year, and it is needless to observe that abundance of rain in one locality does not necessarily make up for the deficiency in others, especially in a hand-to-mouth country like India.

Appendix K gives a diagram showing the course of the rainfall (line C), and of Rupee prices (line B) for each year from 1861. In considering this diagram it must be remembered that the rainfall of a year does not affect the prices of that year only. Rains commence in India from the middle to the end of June, and terminate from the middle to the end of September. It is not finally realised whether the rains are likely to be sufficient or otherwise until some time in August, or later, and possibly the first difference in prices will not appear till September. Thus the year of deficient or abundant rainfall in any year has effect on prices for four or five months only of that year, and for six or seven months of the following year.

In examining the diagram we find short rain in 1864, and prices in 1864 and 1865 rose.

In 1865 the rainfall was nearly normal, and only 8 per cent. deficient in 1866, but prices in both years rose very high. Glancing at Appendix D, however, we find short rain in Orissa and Madras and Mysore in 1865, resulting in actual widespread famine in the first-named, and deficiency in 1866 in the North-West Provinces, Madras, Central Provinces, and Hyderabad. Next, referring to Appendix C, we find that the principal rises in prices were in the products shown against these provinces in the years named. The smaller rise in price elsewhere was due to the greater demand for supplies for the short areas.

1867 shows a full rainfall, and prices in that and the following year fell. 1868 had the smallest rainfall in the thirty-five years, the deficiency being greatest in the Punjab, North-West Provinces, Central Provinces, and Central India, where prices in that and the following year rose to famine rates. The rise in price in these provinces in 1868 was more than counterbalanced by the fall in other provinces, and the year showed a net fall, but rose 12 points in 1869, in which year and the following three years to 1872 the rainfall was normal, and prices rapidly fell, reaching the normal point in 1871. In 1873 there was again a short rainfall, and prices rose considerably in that and the following year. The deficiency was particularly great in Behar and east of the North-West Provinces and in Eastern Bengal, but prices did not rise as high as they would otherwise have done, as the government imported grain from Burma to supply the deficiency in Upper Bengal.

The years 1874 and 1875 experienced rainfalls above the normal, and prices fell heavily in 1875, but a serious deficiency of

rain in 1876 caused them to rise again, and this tendency was further aggravated by another serious short rainfall in 1877, with the result that prices rose 45 per cent. between 1875 and 1878. The short rainfall during 1876 and 1877 was chiefly in the North-West Provinces, Madras, Central Provinces, Bombay, Central India (1877), and Hyderabad (1876). The North-West Provinces suffered in both 1876 (79), and 1877 (56), and the effect on the many food grains cultivated there was disastrous, though the greatest sufferers were the Carnatic Coast of Madras and Mysore, which areas had previously had a short rainfall in 1875 (80) and a very little in excess of half the normal in 1876 and 1877 (55+51). The result was that a serious famine resulted, and prices rose from 300 to 700 per cent. in excess of normal.

The year 1878 experienced a bumper rainfall, which was general everywhere except in the North-West Provinces. The fall in 1879 was normal, and in 1830 10 points short, but prices continued to fall. The years 1881 to 1885 received normal rain, all provinces receiving their due share, except in 1883, when the Punjab and the North-West Provinces were deficient, and prices rose slightly in 1884, falling again in the following year.

The years 1886 to 1890 experienced normal or excess rainfalls, all provinces receiving their share, but prices rose 15 points during the five years.

The year 1891 showed a rainfall short by 9 points; Madras (Carnatic), Mysore, and Hyderabad being the chief sufferers, and prices rose 16 points in that and the following year.

The years 1892, 1893, and 1894 received bumper rains, and prices fell again 13 points.

The rainfall in 1895 was 8 points below normal, Burma and Central India being the chief sufferers; but this apparently did not affect prices.

From this retrospect of the rainfall and prices it seems very clear that the former has been a considerable power in affecting the latter, and it may at once be accepted that the sudden high rise of prices in particular years has been due entirely to the meteorological conditions of the country. In this light the high levels of prices reached in 1866, 1869, 1877, 1878, and partially in 1892, were all due to deficiency of rain. But, even if this is accepted, it is evident that the atmospheric conditions, though responsible for the violent fluctuations, were not responsible for the continued rise in prices. For example, the rainfall was favourable from 1881 to 1894, except in 1891, and yet the rise in prices was steady and continuous. Other reasons must then be considered to account for this. Starting from the year 1871, and eliminating the fluctuations due to the atmospheric conditions of the country,

if the course of Rupee prices as they would apparently have gone had the rainfall been normal each year is followed, and this course shaped from the direction it actually took, it appears that up to the year 1892 a steady rise continued, approximately 34 per cent., and that from 1893 a slow fall set in. This probable line is entered in the diagram (Appendix K) in the dotted line D.

(*b.*) *The Extension of Railways.*

It is argued that every mile of railroad assists in raising prices in India, because it causes an increase in the demand, and as a matter of fact experience has shown that as a line reaches any particular town or village, prices at once spring up, sometimes to even as much as double the former price. Some 14,000 miles of line have been laid since 1871, and if we allow, say, 20 miles on each side of the line as brought within reach of it, the area affected would be 560,000 square miles. This should therefore enormously affect the level of prices generally. But it is very doubtful if it has done so permanently, and it seems that when a town or village becomes accessible to the railway, prices rise, partly because the demand, as compared with the supply, temporarily increases, and partly for imaginative causes, *i.e.*, the idea being prevalent that with the advent of the line, the demand must continue to exceed the supply, and higher prices must continue, quite apart from any laws of political economy. But it is obvious that the original rise in price must attract the same products from places further afield; the result is that roads are soon constructed, and the particular product pours into the place where the price is so attractive, and prices gradually fall, and very soon reach their former level, or very nearly so. It would be absurd to suppose that high prices would continue in any particular place, unless the price had originally been lower than what ruled elsewhere, and though this is sometimes the case, it is also sometimes the case that prices in the interior are above the normal elsewhere, and when railways reach those places, prices have eventually to be reduced in order to get a footing in the market.

It is very doubtful if the extension of railways has had any appreciable effect in raising prices in India.

(*c.*) *Excess of Demand over Supply caused by Increase of Exports.*

This question is one indirectly connected with railways, but has a somewhat different bearing. The aggregate value of exports from India in 1871-72 was Rx. 61,697,225, and in 1892-93 Rx. 101,930,879. It is argued that the additional demand caused

by this increase of Rx. 40,233,654 has had the effect of raising Rupee prices in India.

Let us therefore examine the figures of the principal exports of the two years:—

	1871–72.	1892-93.	Difference. + more. − less.
	Rx.	Rx.	Rx.
Coffee	1,368,949	2,066,862	+ 697,913
Rice	4,446,588	12,391,894	+ 7 945,306
Wheat	235,644	7,440,383	+ 7,204,739
Spices	284,660	514,675	+ 230,015
Sugar	288,048	507,913	+ 219,865
Tea	1,454,985	6,292,348	+ 4,837,363
Opium	13,365,228	9,255,014	− 4,110,214
Indigo	3,687,762	4,141,179	+ 453,417
Cotton	21,272,429	12,743,679	− 8,528,750
Raw hides and skins	2,011,344	2,635,495	+ 624,151
Jute	4,117,308	7,944,223	+ 3,826,915
Seeds	2,728,127	11,631,015	+ 8,902,888
Silk	1,081,097	505,121	− 575,976
Teak	291,280	570,102	+ 278,822
Wool	902,900	1,116,578	+ 213,678
Cotton goods	369,964	8,100,658	+ 7,730,694
Jute goods	182,459	3,237,993	+ 3,055,534
Tanned hides and skins	514,516	2,956,439	+ 2,441,923
Lac	278,944	775,063	+ 496,119
	58,882,232	94,826,634	+ 35,944,402

These heads, as will be seen, represent the great bulk of the exports.

The exports of opium, raw cotton, and silk decreased and need not be considered. The following either fell in price or remained nearly stable, sugar, tea, indigo, raw hides and skins, jute (up to 1889), linseed (up to 1892), rape, castor (up to 1889), teak, cotton goods, jute goods, lac (up to 1889), tanned hides and skins (up to 1893).

Thus we are left with only the following heads to consider, rice, wheat, spices, til, and raw wool, aggregating an export of Rx. 17,808,984 in 1892-93 in excess of 1871-72. This figure includes the export of rice, the great bulk of the increase of which represents exports from Burma; and it must be remembered that a new province in Upper Burma was added in the interval, with a settled government and every encouragement given to trade. The increase of the export from India (excluding Burma) was only 1,450,000 cwt., valued at Rx. 2,224,000; and this small increase in twenty-one years, considering the enormous production, could not have affected prices in the smallest degree.

But even including rice, a reference to Appendix A will show

that the increased demand for exports which have risen in price is under 2·2 per cent. of the production of the country, and it is impossible to believe that this small increase during the space of twenty-one years could not have been met without affecting prices.

The entire increase in the exports amounts only to 4·9 per cent. of the production of the country, and it may safely be said that exports have not had any appreciable effect in raising prices in India.

(d.) Competition of other Countries.

It has been suggested that the increase in the exports caused the demand to exceed the supply, and hence prices have risen. This argument has already been dealt with, but another point in this connection is the effect on prices of the competition of other countries in supplying the exports supplied by India.

As regards the food supply, Rice and Wheat are the only two which are exported to any extent, the latter only since 1881-82 in any quantity. In rice, India has practically no competitor in the particular quality she mainly exports. Rice is exported from Siam, Cochin China, Japan, Madagascar, Java, and Carolina; but all excel and fetch a higher price than Indian rice. Burman rice, on the other hand, excels all others for distillation purposes.

Wheat is another matter. Indian wheat is inferior to all other wheats, and ordinarily only fills gaps in the supplies from other countries. The price must therefore be regulated by prices elsewhere, when the supply from those countries is sufficient to meet the demand; if it is not, India can fix the market, and probably did so for many years before Argentina commenced her export of the grain. It seems probable that the prices of neither rice or wheat have been affected by outside competition, though in the case of wheat it is possible that prices might otherwise have risen higher than they have done. Tea, coffee, indigo, and opium are almost entirely produced for export. The price of coffee has risen considerably owing to the abolition of coffee planting in Ceylon. In tea, India has Ceylon and China as competitors; this, coupled with the enormous increase in the production in recent years, has caused the supply to exceed the demand, and prices have fallen. In indigo and opium India holds a monopoly, but in both commodities the supply has apparently exceeded the demand, and prices have fallen.

Jute, seeds and hides, and skins are also produced to a great extent for export purposes. Jute is a monopoly of India, and in seeds India only has Russia, and recently Argentina, as competitors. The exports of seeds from Russia were much smaller than from India, her supply was limited, and India practically

held a monopoly. The area cultivated under jute has increased enormously during the past twenty years, and the supply and demand up to 1890 apparently equalised each other, as prices remained fairly steady, some years up, some years down. Since 1891 the price has risen. The same remarks are applicable to seeds, except "til" which has risen in price. Raw hides, in which India has competitors in Australasia, South Africa, and Canada, fell in price, whilst skins rose. Coal has had to compete with English coal, and being much inferior, has fallen in price. Raw wool, in spite of its many competitors, has however risen.

Cotton goods in competition against England have fallen in price, whilst jute goods, also in competition with Great Britain, were fairly steady up to 1888, when a rise took place, followed by a fall to normal prices, and silk goods have also been fairly steady.

From this brief summary of the facts it appears that in cases when India has had to compete with other countries in the supply of any commodities, prices have ordinarily remained steady, or have fallen, and as the bulk of the commodities indigenous to the country, which form the very greatly preponderating portion of the inland trade of the country, the trade which actually regulates the question of the position and course of prices, have risen in price, it is evident that the export trade, and its various interests and conditions, have caused the general level of prices to be considerably lower than it would otherwise have been.

(*e.*) *The Condition of the Currency.*

We have now to consider the important question of the condition of the currency, and its effect on the level of prices. Some years ago Mr. F. C. Harrison, of the Indian Financial Department, published an article on the "Rupee Census" in the "Economic "Journal," and the facts and suggestions then made have been brought up to date year by year. The method employed by him was borrowed from Jevons, on the principle that if the mintage of a certain year formed 20 per cent. of the circulation, the circulation could not exceed five times the amount minted in that year. The theory is no doubt sound, and the method adopted by Mr. Harrison for working it out admirably conceived and ably executed; but what economists require to know is whether the theory is altogether practicably applicable to India, where two such factors as hoarding and melting down coined money are so common, circumstances which might tend to vitiate any general theory. To test this, an attempt has been made to work out the circulation, year by year, on practical lines based on such information as is available for the purpose. The result is given in Appendices E

nd F, and the principle and method adopted for arriving at the igures given are explained below.

Appendix E opens with the gross import of Silver and the amount received into the mints for coinage. It is necessary to commence with the year 1835, as all coinage since that date is now legal tender. The figures given are the recorded ones, and show a gross receipt of Rx. 446,644,853 in the sixty-one years from 1835 to 1895, of which Rx. 326,274,410 was taken to the mints. The Custom House returns did not distinguish between bullion and Government Rupees before the year 1893, and some portion of the balance of imports not taken to the mint was in the shape of coined legal tender rupees.

Col. 4 gives the gradual decrease in the circulation of the coinage coined before 1835, which ceased to be legal tender in 1877. Of this coinage about 23 crores is recorded as having been tendered to the mints for recoinage between 1835 and 1876, and remembering that the coinage between 1800 and 1835 amounted to $65\frac{1}{4}$ crores, it is a fair assumption that the circulation, including the cash balance in the government treasuries, was at least 37 crores in the beginning of 1835, of which 23 crores was recoined and the balance of 14 crores otherwise absorbed, probably mainly in ornaments, during the forty-one years it remained legal tender. The rate of decrease is based on the amount tendered each year for recoinage, which is given in detail in Col. 5, whilst Col. 6 contains the balance otherwise disposed of.

Col. 7 shows the balance of Silver bullion and imported Government Rupees not taken to the mints, and the ante 1835 coin melted down each year. The aggregate of the two amounts to Rx. 134,370,443 for the whole period of sixty-one years, and may be considered to represent an almost absolutely correct figure.

The next point for consideration is how this enormous mass of Silver was disposed of, and in dealing with the balance not taken to the mints the import represented by coined Rupees will be treated as bullion, as, for reasons which will explain themselves hereafter, it is practically immaterial whether the import was entirely Rupees or entirely bullion. Silver bullion is used in the Native States mints for the manufacture of ornaments and for export, and possibly also to a limited extent for hoarding. In order to arrive at the circulation, it is of no real consequence to ascertain in what proportion under each head the net bullion available each year was disposed of, but it is necessary to allot the balance available to one or other of the heads so as not to allot newly coined Rupees for the same purpose again. In this view the Native mints have been first dealt with, and assigned their annual requirements for coinage purposes from the bullion; when a

balance still remains available, it has been assigned to the purpose of making ornaments, and if there is a still further balance, it has been treated as an export.

We now arrive at the second part of the statement, and enter into the uncertain and estimated portion. We have first to ascertain what the annual demand for Silver (coin or bullion) for ornaments was during the whole period. There is practically little to guide us in forming an estimate except the figures for 1894 and 1895. The gross import of bar Silver in 1894 and 1895 was Rx. 15,604,817. Of this Rx. 18,024 went to the Indian Mints, Rx. 1,976,896 was disposed of at the mints of the Native States, and Rx. 852,963 was exported, aggregating Rx. 2,847,883, leaving Rx. 12,756,934 for disposal otherwise. It is well known that a considerable amount of Rupees came out of hoards during the two years in question, their place being taken by uncoined Silver, but it is of course impossible to say what the exact figure was. It will probably be well within the mark to put it down at $3\frac{1}{4}$ crores for the two years, which leaves $9\frac{1}{2}$ crores, or $4\frac{3}{4}$ crores a year for ornaments. This figure has accordingly been accepted as the demand for the two years, and the basis on which the estimate for the whole period has been framed.

The population of all India was about 300 millions in 1895; a demand of Rx. 4,800,000 for ornaments therefore represented a demand of 1 crore of rupees for every 63 millions of people.

In 1835 the population of all India was about 163 millions, and it may fairly be estimated that the individual wealth in the country in 1895 was proportionately at least double what it was in 1835. On this assumption one crore of Rupees for ornaments in 1835 was sufficient for 125 millions of people, and this figure, representing an outlay of Rx. 1,300,000 for that year, has been treated as the starting point, the allotment for each intervening year gradually increasing in proportion to the increase of population and wealth, and working up to the ascertained allotment for 1895. In certain years, *i.e.*, the mutiny and famine years, a smaller allotment has been made, as it is well known that Natives sell their ornaments in times of scarcity; in fact, in the famine years of 1877, 1878, about $2\frac{1}{4}$ crores of rupees of Silver was tendered at the mints for coinage in excess of the gross import.

The result of this estimate gives a grand total of Rx. 138,163,777 in actual weight of Rupees, representing above 200 crores in value. Of the population of 300 millions in 1895, about 146 millions were females, and of these only about 87 millions were 15 years of age and over. Silver ornaments are not often permanently lost in India, and their wastage is not very considerable, as great care is ordinarily taken of them. If therefore we leave out of considera-

tion all Silver ornaments made before 1835 (the import of Silver between 1800 and 1835 was 82½ crores), and take a loss on account of wastage of 5 per cent. on the manufacture since that date, we find that every female in the country now possesses on an average Rs. 9 in weight of ornaments, at a value of about Rs. 13 or every female of 15 years and upwards possesses on an average Rs. 14¾ in weight of ornaments, at a value of Rs. 21. These figures at first sight do not appear high, but those who know India are aware of the many millions of the poorer classes whose females do not possess a single ornament of any description, whilst the ornaments of the richer classes are ordinarily in Gold, of which metal 148½ crores worth was imported between 1835 and 1892. This amount of Gold with the Silver allotted for ornaments and plate, aggregates 286½ crores in weight alone. The probabilities appear to be that the figures, if erring on either side, err on the side of excess.

Col. 12 shows the portion of the annual demand for ornaments met from coined Rupees. It is a popular notion that these ornaments are almost entirely made from coined money, which is a sort of trade mark guaranteeing the genuineness of the metal. It is probable that most natives endeavour to have their ornaments made out of coined money, but it is equally probable that the silversmith as often as otherwise manages in his own interests to substitute bullion for coins when putting the metal into the melting pot. If this was not the case, it would be quite impossible to account for the enormous amount of Silver bullion brought to the country and not taken to the mints. The statement shows that Rx. 74,109,844 worth of bullion, and Rx. 64,053,933 in coined rupees, were used for the purpose.

Col. 13 gives the annual demand for coinage at the mints of the Native States. This again is an estimate, as no record appears to have been kept of the amount so coined previous to 1891. In 1891 and 1892 the coinage was Rx. 2,657,157, but a considerable part of this was recoinage, which is not distinguished in the returns; the sum of Rx. 1,200,000 therefore probably represents the actual new demand in each of the two years. On this basis, the mintage for the whole period of sixty-one years has been estimated, giving an aggregate total of 44 crores. Of this coinage the probabilities are that the greater portion still remains in circulation in the shape of Native coinage, because the people of the Native States, for obvious reasons, much prefer to hoard or to make their ornaments out of Government Rupees. The population of British India is at least six times that of the Native States minting their own coin, and even in these States the Government Rupee is in considerable circulation. If therefore the present

circulation of Government Rupees is 160 crores, it is very improbable that the circulation of the Native mints exceeds 25 crores, probably very considerably less, and the aggregate coinage of 44 crores allowed for, gives a wide margin for absorption in other ways.

Col. 14 shows the amount of this mintage out of Government Rupees, *i.e.*, the total Native coinage in Col. 13 minus the Native coinage from bullion, Col. 8.

Col. 15 gives the recorded export of Silver by sea, aggregating Rx. 71,578,186 for the whole period. Some portion of this returned to India by sea, and was included without distinction in the sea imports, and some portion returned by land. No allowance has been made in the statement for exports privately made, because the probabilities are that the imports similarly made were at least equal to the exports. The exports as recorded do not distinguish between bullion and coined money, but it is known that a considerable amount of bullion has left India at different periods for China and elsewhere, occasionally for Europe. The bulk of the export has, however, been treated as coined money, the aggregate up to the end of 1892, given in Col. 16, amounting to Rx. 51,589,187, whilst the export of bullion is shown in Col. 10 as Rx. 15,141,899.

We must now refer to the second statement, Appendix F. In Col. 2 we find the circulation of Rupees coined before 1835, which gradually diminished till all disappeared in 1877, when this coinage ceased to be legal tender.

Col. 3 gives the coinage since 1835, including recoinage of the ante 1835 Rupees, Col. 4 giving the totals to date.

Cols. 5 and 6 give the investment of the currency reserve in Government securities, representing an issue of Rupee paper without reserve, and therefore adding to the circulation.

Cols. 7 and 8 give the net import or export of treasure as recorded in the Inland Trade Returns, figures for which are recorded from 1877 only.

Col. 9 gives the annual total of these various columns, and may be accepted as representing a figure as nearly correct as possible.

Col. 10 gives the recorded cash balance in the Government treasuries. This represents so much money locked up, and has therefore been treated as a reduction of the circulation. From 1862 the average of the balances on the last day of every month in the year has been taken, but previous to 1862 this information is not available, and the balance at the end of the financial year has been adopted.

Cols. 11 and 12 give an estimate of the coin hoarded in the country. This is probably the most uncertain of all the heads

dealt with, as there is absolutely no information of any sort to be obtained. It is, however, certain that the popular idea is a very exaggerated form of the truth, and the enormous hoards that are said to exist are frequently, as has often been proved, mere efforts of the imagination. The late Maharajah of Scindia was reported to have hoarded an almost incredible amount, but when he died in 1889, his hoard was found to amount to 4 crores only, and this was turned into Government paper, and the Rupees swelled the circulation. Some years back a man, represented to be the wealthiest individual in the North-West Provinces, was said to have hoarded at least 10 crores of rupees. On his death under half a crore was found. These are two examples out of many. It is possible that the wealthier natives hoard to some extent in Gold, as there was a net import of Rx. 148,490,518 of that metal between 1835 and 1892, and it seems impossible that the whole of this could have been turned into ornaments. The estimate of Silver hoards entered in the statement gives a total of 50 crores of Rupees, and this probably represents the very maximum.

Cols. 13, 14, and 15 give the coin melted in Native mints, and as ornaments and exported, brought up to date each year, from Cols. 13, 14, and 15 of the previous statement (Appendix E).

Col. 16 gives the annual total of all the columns which represent the absorption of the Rupee, and Col. 17 makes the deduction of these heads from the gross calculation, representing the active circulation each year, and Col. 18 gives the index numbers on the basis of the circulation of 1871 = 100. The result is as follows:—

Year.	Active Circulation.	Index Number.	Year.	Active Circulation.	Index Number.
	Rx.			Rx.	
1861	57,183,821	51	1879	136,075,501	120
'62	64,468,467	57			
'63	77,602,002	69	1880	137,079,748	121
'64	91,407,297	81	'81	135,418,684	120
'65	108,255,462	96	'82	136,068,117	120
'66	113,527,955	100	'83	136,637,204	121
'67	115,370,858	102	'84	138,298,508	122
'68	119,631,233	106	'85	144,765,848	128
'69	124,215,944	110	'86	143,719,791	127
			'87	146,681,704	130
1870	118,360,831	105	'88	148,076,249	131
'71 ..	113,127,322	100	'89	156,261,197	138
'72 ..	111,394,516	98			
'73	110,719,184	98	1890	162,559,570	144
'74	114,502,090	101	'91	161,882,324	143
'75	110,268,052	97	'92	168,055,176	148
'76	110,898,953	98	'93	166,904,139	147
'77	127,882,331	113	'94	161,851,025	143
'78	130,823,873	116	'95	164,906,884	146

It is noteworthy that if the active circulation in 1892 is added

to the cash balance in the treasuries it amounts to 181½ crores which is almost identical with the 180 crores estimated in that year by Mr. E. O. Leech, then Director of the United States Mint, as the circulation of India.

Mr. Harrison, as a result of the working of his theory, concludes that the circulation (including the Government cash balances) was 115 crores from 1876-86, that in 1888-89 it rose to 120 crores, and was about 125 crores in 1892-93. The figures worked out in this paper differ considerably in quantity, but both tend in the same direction of increase. Mr. Harrison, however, allows for an increase of 10 crores only in the seventeen years 1876-92. During that period 173 crores of silver were imported into the country, 2 crores were added to the circulation by the investment of the Currency Reserve, 4 crores came out of Scindia's hoards, about 3 crores were recoined and swelled the circulation from the new Upper Burma province, 3 crores were received on the balance of the inland trade, representing a total of 185 crores. Of this 24¾ crores were exported, and not more than 18 crores could have been required in the Native mints, leaving 130¼ crores to be otherwise disposed of. Mr. Harrison adds 10 crores to the circulation, but it seems almost impossible that the whole of the remainder, *i.e.*, 120 crores, could have been absorbed in ornaments and hoarding during the seventeen years in question.

Looking at the figures given in the statement, in the period under review from 1861 we find the circulation increased very rapidly up to 1866, and from then to 1876 it remained almost at the same figure, with variations each year; the circulation in the latter year being 3 crores under that of the former. In 1877 a very marked rise took place, gradually increasing during the two following years, when it became almost stationary again, up to 1884; a rise then recommenced, and continued up to 1892, after which a contraction set in.

The index numbers have been entered in the diagram, Appendix K, in a dotted line A, and the similarity of the course of the circulation from 1877 with the course taken by Rupee prices after eliminating the effects of the rainfall, as shown in line D, is very marked. It is true that the circulation rose higher than prices in 1877, but it is obvious that, even if prices had remained stationary, the circulation would have had to increase slightly in order to meet the increase in population and wealth of the country, whereas the increase has been out of all proportion to actual requirements. The figures and the course the two have taken, as shown in the diagram, appear to form a peculiar proof of the quantitative theory, and show that the continuous

inflating of the currency has had a marked effect in raising prices. Lord Herschell's committee when sitting to consider the question of the closing of the Indian mints, declared that the open mints attracted more Silver than the country required. This argument has recently been tabooed on the ground that such an event was an impossibility, because India only received Silver in payment for the goods she exported. Economists, however, do not require to be reminded of the flaw in this argument, and the figures given unquestionably prove that the declaration made by the committee was correct.

(*f.*) *Summary of the Causes of the Fluctuations.*

From the facts and figures given in this section of the paper, it appears that the first and most important factor which has assisted in causing the serious fluctuations in Rupee prices has been the rainfall of the country. But the fluctuations so caused though violent were only temporary, and if all else had remained the same, prices would apparently have resumed their normal condition after the effects of the short supply of rain had passed away. But, as a matter of fact, prices did not resume their normal state, indicating that other causes entered into play in raising prices.

Of the next three suggested factors, we find that though both the extension of railways and the increased demand for exports may have had a tendency to raise prices, that tendency was only temporary, or, if permanent at all, only in a slight degree, whilst on the other hand the competition of a foreign country in India's products had a distinctly deterrent effect against a rise of the prices of the commodities concerned, and in some cases necessitated a fall. Had not this latter factor come into play, it appears evident that the general level of prices of all commodities taken would have risen higher than has actually been the case. A reference to the statement in Section IV above (p. 92), Col. 2, will show that if food commodities alone are taken, and the food supply is the one least affected by outside competition, the rise is considerably higher than the rise shown in Col. 5, the prices of all commodities. Col. 4, the prices of Indian manufactures, shows practically normal figures with a tendency to fall, and it is in manufactures that India has the greatest competition with outside.

The last factor, the condition of the currency, has played an important part in raising prices. The fluctuations caused by this factor are not so violent as those caused by the rainfall, but are more permanent, though now that the inflation of the currency is being reversed, and contraction is setting in, prices will no

doubt continue to fall after the present pressure is removed, provided that the meteorological conditions do not again derange matters, as they are doing in the present year.

VII.—*Monthly Prices.*

It is a matter of interest to economists generally to trace the effect of the closure of the mints in India on Rupee prices. With this object monthly index numbers have been prepared for the period January, 1891, to July, 1896. The numbers in relation to Gold have also been worked out, and both are entered in a diagram, Appendix L, in which is also entered Mr. Sauerbeck's index numbers of Gold commodities, and index numbers of the Gold price of the Rupee, and of Silver.

The index numbers of Rupee prices in India, (1) in relation to the Rupee, (2) in relation to Gold, are as follows:—

Rupee Prices in relation to the Rupee.

	1891.	1892.	1893.	1894.	1895.	1896.
January	121	141	141	132	130	128
February	122	140	141	131	129	129
March	124	140	141	129	127	127
April	124	141	138	131	126	127
May	124	142	139	132	127	130
June	124	142	138	133	128	133
July	125	142	137	133	128	134
August	129	142	137	134	129	—
September	131	140	138	132	128	—
October	131	138	137	131	129	—
November	133	141	136	130	129	—
December	144	144	133	129	128	—

Rupee Prices in relation to Gold.

	1891.	1892.	1893.	1894.	1895.	1896.
January	95·2	98·8	89·1	83·6	70·2	76·8
February	90·9	95·5	89·0	77·6	70·8	79·2
March	91·5	93·9	88·3	76 9	70·6	79·1
April	90·4	91·8	86 4	76·2	71·9	77·1
May	89·7	93·3	87·6	72·9	72·3	77·6
June	90·4	94·4	88·7	74·2	72·6	80·2
July	93·5	92·6	91·8	73·4	72·1	81·2
August	95 6	89·2	89·0	76·1	73·1	—
September	96·2	87·6	89·3	76·4	73·9	—
October	95·2	88·0	88·8	74·7	76·0	—
November	95·2	90·0	88·7	73·8	76·0	—
December	102·7	90·1	86·2	70·7	76·2	—

It will be noticed in the statement of Prices in relation to the Rupee that prices rose all through 1891, in 1892 they were fairly

steady throughout the year, and continued so till July in the following year. In that month, following the closure of the mints, prices began to drop, and though this drop was scarcely perceptible at first, yet the index number in January, 1894, was nine points lower than in January, 1893. Throughout 1894 prices remained fairly steady, with a downward tendency, and again in 1896 up to April, when the index number was only three points lower than in January, 1895, and five points lower than in January, 1894. In May, 1896, prices sprang up three points, and another three in June, and four in July. This rise was due to anticipated short rains, which were unfortunately experienced during the recent rainy season.

The inference to be derived from these figures is that the closing of the mints had an almost immediate effect on prices, probably due to the fact that it was at once realised that the previous continuous inflation of the currency would cease, and as a matter of fact, as has already been shown, a slight contraction of the currency took place during 1893-94.

Looking next at the second statement, giving Rupee prices in relation to Gold, and line C in the diagram, Appendix L, we find that prices had a downward tendency during 1892 and in 1893 before the mints were closed, after which they remained fairly steady for the rest of the year, excepting a temporary rise in July, 1893. In 1894 the fall became very marked, recovery taking place very slowly during 1895 and 1896, beginning from April, 1895. The heavy fall in 1894 was due to the rapid fall in the rupee in that year owing to the procedure adopted in the sale of Council Bills.

If we take the years 1891 and 1892 and the five months of 1893, before the closure of the mints, we find the monthly averages to have been :—

Gold	100
Rupee prices	92·1
Silver	68·6

Taking Rupee prices as the standard, Gold appreciated 7·9, and Silver depreciated 23·5.

In the two years and seven months after the mints were closed the monthly averages were :—

Gold	100
Rupee prices	77·6
Silver	50·0

That is to say, with the Rupee price as the standard, Gold appreciated 22·4, and Silver depreciated 27·6. But, as has already been inferred, the position since the closing of the mints has been

peculiar, as the course adopted by the India Office in regard to the sale of Council Bills caused the Rupee to remain steady for a time, and afterwards to fall very rapidly and heavily, with the result that the consequences were not natural, and therefore not a safe guide of the actual effect of the closing of the mints.

The following figures are the monthly index numbers of Silver and of the Rupee for the period in question:—

	1891.		1892.		1893.		1894.		1895.		1896.	
	Silver.	Rupee.	Silver.	Rupee.	Silver.	Rupee.	Silver.	Rupee	Silver.	Rupee.	Silver.	Rupee.
January	78·9	78·7	70·4	70·1	63·0	63·2	51·7	63·3	44·9	54·0	50·4	61·4
February	75·0	74·5	68·2	68·2	63·0	63·1	48·1	59·2	45·1	54·9	50·9	61·4
March	73·9	73·8	67·2	67·1	62·6	62·6	44·8	59·6	46·5	55·6	51·5	60·7
April	73·1	72·9	65·2	65·1	62·5	62·6	47·3	58·2	50·0	57·1	51·1	60·3
May	73·1	72·3	65·9	65·7	62·6	63·0	47·2	55·2	50·3	56·9	51·1	60·1
June	73·9	72·9	66·7	66·5	61·4	64·3	47·1	55·8	50·0	56·7	51·6	59·3
July	75·6	74·8	65·2	65·2	54·6	67·0	47·1	55·2	50·0	56·3	51·5	59·2
August	74·7	74·1	63·0	62·8	55·7	65·0	48·2	56·8	50·0	56·7	50·8	60·6
September	74·0	73·4	62·7	62·6	56·1	64·7	48·7	57·9	50·2	57·7	49·9	60·7
October	73·3	72·7	64·0	63·8	55·5	64·8	47·8	57·6	50·9	58·9	49·4	61·6
November	71·8	71·6	64·0	63·8	52·9	65·2	47·6	56·8	50·6	58·9	49·2	65·2
December	72·0	71·3	63·1	63·0	52·6	64·8	45·7	54·8	50·1	59·5	49·2	65·5

Silver = 60·84*d.* per oz. = 100. Rupee = 23·34*d.* = 100.

VIII.—*The Export of Food Grains.*

It will probably be asked how it is that, with the great rise in price of food grains as shown in this paper, it has been possible to export from India at all, remembering also that the Gold price of Silver and of commodities fell in an almost equal degree up to 1893, the fall in the price of wheat and rice exceeding the general fall. These two, wheat and rice, are the only food grains that are exported from India, and they alone need therefore be considered. As regards rice, there are special features in the Burma production in its great suitability for distillation purposes, which render it practically a monopoly. But apart from this, we find that the index number of rice as given by Mr. Sauerbeck fell to 55 in 1895, whereas English Gazette wheat fell to 42. It will therefore be sufficient if we discuss the position of wheat, and the remarks made in so far as prices are concerned, will apply also, only possibly more forcibly, to rice, and explain how its export has been profitable at enhanced Rupee prices.

Indian wheat, as is well known, was not accepted for many years in England, and the export was only nominal. In 1873 the export duty on it was abolished, and in 1873-74 the export was nearly six times that of the previous year, but even then it only

amounted to $1\frac{3}{4}$ millions of cwt. In 1875, 1876, and 1877 England's crop partially failed, and India helped to fill the gap, the export amounting to nearly $6\frac{1}{2}$ millions of cwt. in the latter year. In 1878 and 1879 India was visited by famine, and the export fell off. Previous to this English millers had complained that Indian wheat did not suit their mills, and the late Dr. Forbes Watson was deputed to inquire into the matter, the result of which was the issue of a memorandum pointing out the obstacles against the Indian grain gaining popularity in the English market. Since then efforts have been made to remove those obstacles, and with some success, but apart from this, Indian wheat is inferior in quality to other wheats, and commands a lower price. In 1881 England's harvest was again deficient, and in the following year the American crop failed, a syndicate of speculators "cornered" the grain, and Indian exports sprang to nearly 20 millions of cwt. In 1882 the export fell to 14 millions of cwt. In 1883 the American crop was again short, and India's export rose to 21 millions of cwt., Italy assisting in this case by taking a supply for the manufacture of maccaroni, a new use of the grain. In 1884 the American and European crops were abundant, and India's export decreased. In 1885 both America and Europe had short crops, and India's export rose to 21 millions of cwt. In 1886 Russia's crop again failed, and India's export amounted to $22\frac{1}{4}$ millions of cwt., Italy taking over 5 millions. In the following years up to 1890 Europe and America had average crops, and India's export fell away. In 1891 the European crop was short, and Russia's failed entirely, and export was prohibited from that country, with the result that India's export amounted to $30\frac{1}{4}$ millions of cwt. Since then the American and European crops have been average or above the average, and India's exports have fallen away. From these facts we are probably justified in assuming that Indian wheat is accepted in the European market only when other wheat is not obtainable; in short, that India's production merely fills the gap of the demand less the supply, though possibly this gap may sometimes have been an important one. This point will be referred to later on.

We now come to the question of prices.

The following table gives the total export from India and the amount exported to England, the index numbers of the Rupee prices of Indian wheat taken from the average of the four classes given in Appendix C. These prices have then been converted into Gold at the exchange rate of the year, and their index numbers given. Col. 6 gives the index numbers of the total cost in Rupees of 100 maunds of Cawnpore wheat landed in London, *viâ* Calcutta. This cost includes the wholesale price, the railway and steamer

freights, and shipping charges. Col. 7 converts these prices into Gold at the average exchange rate of the year, and lastly, Col. 8 gives the index numbers of the average of the two classes of wheat given by Mr. Sauerbeck in his Gold prices.

Wheat.

1	2	3	4	5	6	7	8
Year.	Export from India.	Import, Indian Wheat into England.	Index Numbers of Price of Indian Wheat.	Index Numbers, Price of Indian Wheat in relation to Gold.	Index Numbers of Total Cost of Indian Wheat Landed in London.	Index Numbers of Total Cost of Indian Wheat Landed in London in relation to Gold.	Index Numbers of Prices of English Wheat.
	cwt.	cwt.	rupee prices.		rupee prices.		
1871	637,099	—	100	100	100	100	102
'72	394,010	161,915	106	105	108	107	105
'73	1,755,954	741,350	111	108	111	108	110
'74	1,069,076	1,069,076	106	102	98	94	102
'75	2,498,185	1,339,376	90	84	89	83	84
'76	5,583,336	3,296,575	84	73	94	81	85
'77	6,340,150	6,106,079	112	101	114	103	101
'78	1,044,709	1,820,881	148	128	104	90	85
'79	2,195,550	889,531	127	107	104	88	83
1880	7,444,375	3,230,144	117	101	105	90	86
'81	19,863,520	7,338,751	101	86	99	84	88
'82	14,144,407	8,463,716	106	90	94	80	85
'83	20,956,495	11,248,988	105	87	94	78	78
'84	15,830,754	7,980,981	93	77	78	65	65
'85	21,060,519	12,175,260	88	70	76	61	61
'86	22,263,320	11,027,143	103	77	84	63	59
'87	13,538,169	8,512,526	129	95	94	69	60
'88	17,610,081	8,166,254	129	91	98	69	62
'89	13,799,224	9,218,218	120	84	93	65	59
1890	14,320,496	9,111,625	124	97	94	74	61
'91	30,303,425	13,011,253	141	105	106	79	69
'92	14,973,453	12,496,335	148	97	98	64	57
'93	12,156,551	6,199,985	130	83	94	60	49
'94	6,887,791	4,767,829	111	64	90	52	41
'95	10,003,114	6,035,430	125	71	93	53	44

The actual effect of the figures given in this table are more clearly shown in the diagram given in Appendix J. In this line A represents the price of wheat in India in relation to Gold, line C, the Gold cost of Cawnpore wheat landed in London, and line B, the selling price of wheat in England.

If we compare the first with the last, we find that the divergence between the Gold price of wheat in India, and in London, on the basis of comparison with the year 1871, is very marked, and it is evident that if all else had remained the same, it would often, more especially since 1887, have been unprofitable to export

wheat to England. But the cost of transit, &c., has decreased so enormously, that when we consider the Gold cost of Indian wheat, landed in London, and its selling price there, the matter assumes an entirely different aspect. The railway freight of 100 maunds of wheat from Cawnpore to Calcutta decreased from Rs. 78 in 1871 to Rs. 48 in 1890, at which it now stands. The steamer freight has varied greatly. It reached its highest point in 1876 at Rs. 133·20, and fell to Rs. 37·43 in 1873. In 1881 it was Rs. 125·52, since which the rate gradually fell to Rs. 54·12 in 1890. It rose to Rs. 82·12 in 1891, and was Rs. 63·81 in 1895.

With these variations, and with the fall in the Gold price of Silver, we find the English selling price of wheat running very evenly with the aggregate cost of landing Cawnpore wheat in London from 1871 to 1886, in several years the lines running absolutely identically. If we take the year 1883 as an example, a year in which the index number of both is 78, and work out the prices, we find that with the charges taken (not necessarily all, as wastage, agency charges, and shipping charges in England have not been included) the result means a profit of nearly 20 per cent. on the outlay to the exporter.

Since 1887 prices have not worked so evenly, but if a profit of nearly 20 per cent. was obtainable in 1883, it is evident that a very large profit was still obtainable in 1891, when the index numbers diverged by 10 points, and exports amounted to 30¼ millions of cwt., the bulk of which was taken for the European Continent.

It was before remarked, for the reasons stated, that India's supply was required in England and Europe only for the purpose of equalising the supply and demand, and the diagram appears to bear out this inference, for it will be noticed that the largest exports were not in the most profitable years, 1882 and 1884 for example; whilst on the other hand the year 1891 is an example of the heaviest export in one of the least profitable years.

In 1893 the total production of wheat in India amounted to 192 millions of cwt., of which 12 millions were exported, representing about 6 per cent. It is hardly possible that this small export could have affected prices in the country one way or the other, and we may infer that the Indian prices of the grain have been fixed on their own merits, and quite irrespective of the Gold price in the London market. But if England requires wheat from India in order to equalise the supply and demand, it is evident that she must accept it at India's price, and this has apparently been done. In other words, India has in reality for many years past (Argentina has possibly taken her place in recent years) fixed the Gold price of wheat in London, Europe, and America. Now the importance

of wheat in England as a commodity requires little or no comment; it is probably the most important of all commodities, and the variations in its price sooner or later necessarily affect the prices of other commodities. If this is admitted, it is evident that India's influence on the price of English wheat has also acted as an influence on all Gold prices. India therefore appears to have played an important part in the general fall of Gold prices, and has even to some extent brought it about by her powers to sell her Silver goods at a lower and lower price, as the Gold price of Silver fell, a fall rendered possible by the demonetization of Silver in the West, and put into force by the system adopted by India for the sale of her Council Bills, coupled with her open mints.

IX.—*Wages in India.*

In the Blue Book published by the Government of India, "Prices and Wages in India," the reputed wages of certain classes in different localities is given dating back to various dates chiefly from 1873. The population of all India according to the census of 1891 includes—

	Per Cent.
1. Agriculturists	61
2. Industrial	16
3. Labourers	9
4. Profession	4
5. Domestic	4
6. Commerce	3
7. Others	3

For the last four, which aggregate 14 per cent. of the whole, no record of wages is apparently kept, but for the first three, the great bulk of the whole, figures are given.

In the following statement the wages of the agricultural labourer at six different selected typical localities are given, and four classes under the heads "Industrial" and "Labourers."

The result, given in the last column, representing the average index numbers of the whole, shows that there has been a distinct tendency to a rise in wages, though that rise has not been regular throughout.

Year.	Agricultural Labourer.						Carpenter, Skilled, Mirzapore.	Unskilled. North-West Provinces, Lahore.	Skilled Blacksmith, Madras.	Unskilled Coolies, Murree Brewery, Punjab.	Total.	Average.
	Patna.	Cawnpore.	Delhi.	Bombay.	Jubbulpore.	Salem Madras.						
1873....	100	100	100	100	100	100	100	100	100	100	1,000	100
74....	100	100	100	106	100	100	100	100	100	101	1,007	101
'75....	100	100	89	106	100	100	80	99	98	102	974	97
'76....	100	103	89	106	125	100	80	100	80	102	985	98
'77....	100	103	89	106	125	100	80	100	80	91	974	97
'78....	100	100	89	106	125	100	90	100	93	91	994	99
'79....	100	103	89	106	125	120	90	102	80	88	1,003	100
'80....	100	103	89	106	125	100	100	102	80	88	993	99
'81....	100	103	89	106	125	90	90	102	97	88	990	99
'82....	100	103	89	114	125	90	90	102	97	88	998	100
'83....	100	103	89	122	125	80	90	102	97	110	1,018	102
'84....	107	103	89	124	100	93	90	102	96	110	1,014	101
'85....	129	93	100	122	100	107	100	102	97	110	1,060	106
'86....	129	107	114	122	87	93	100	103	97	95	1,047	105
'87....	136	120	100	122	100	160	100	116	87	95	1,136	114
'88....	129	107	100	122	87	160	100	119	100	95	1,119	112
'89....	129	107	100	122	87	147	100	128	101	95	1,116	112
'90....	129	107	100	122	87	147	120	124	101	95	1,132	113
'91....	129	120	100	122	125	133	120	130	102	95	1,176	118
'92....	129	80	100	122	87	150	100	136	103	95	1,102	110
'93....	129	120	100	122	87	150	150	136	103	95	1,192	119
'94....	129	120	133	122	87	150	120	138	103	95	1,197	120
'95....	129	120	100	122	87	153	100	147	103	95	1,156	116

X.—*The Course of Silver and the Rupee.*

It is popularly believed that before the mints were closed the Rupee followed Silver, and that since their closure the two have acted independently of each other. Appendix L shows the course of the Rupee and Silver monthly since the mints were closed, and brings out the following facts as quoted from a note by Mr. J. E. O'Conor, C.I.E., Director-General of Statistics in India, who published a diagram and an explanatory note in his last "Review "of Trade in India," showing the course of the Rupee and Silver half-monthly from January, 1892, to 30th June, 1896.

"(1.) The price of silver, which seemed to have been steadying in the last two months of 1893, fell rapidly and heavily immediately after the announcement in January, 1894, regarding the sale of Council Bills to the highest bidder, and as there was no other reason for the fall, it is not unreasonable to infer that the fall was caused by the fall of the rupee which it followed."

"(2.) Since then every rise or fall in the value of the rupee has been accompanied by a rise or fall, though not exactly a similar rise or fall, in the price of silver."

The conclusion arrived at is that, since the closure of the mints, the Rupee has become the dominant factor, and, on the whole, determines the price of Silver. The reason why this has been the case is, to quote Mr. O'Conor again, as follows:—

"The demand (of silver) from India is not, it is true, equal to more than about a sixth of the production of silver, but it is a regular and wholesale demand, while all the other demand for silver is of a fitful and more or less retail character, and the silver market, which is of a very sensitive nature, is in its general movements over a period evidently more affected by the Indian demand than by all other demands put together. Therefore when the conditions of trade (or speculation) induce a demand for Council Bills, and a rise in the exchange value of the rupee, and Indian dealers in silver think it will be profitable to import the metal, an immediate effect is produced upon the silver market, which responds to the rise in the value of the rupee by a more or less equivalent rise in the price of silver. There certainly are times when silver is not affected by the rupee, and moves up and down independently and in response to other influences; such movements are of a transitory and fleeting character, and the general movement of the silver line is distinctly responsive to the general movement of the rupee line."

On this point facts and figures appear to bring us to the conclusion that Mr. O'Conor's contention is correct, and that the explanation of the cause of the apparent economic phenomenon is perfectly consistent with the probabilities of the case. But the first point regarding Silver having been the dominant factor in regulating the Exchange value of the Rupee before the mints were closed is another matter, and is not of such certainty as would naturally be inferred.

The monthly fluctuations of Silver and the Rupee in 1891 and 1892 were as follows:—

	1891.		1892.	
	Silver.	Rupee.	Silver.	Rupee.
January	78·9	78·7	70·4	70·1
February	75·0	74·5	68·2	68·2
March	73·9	73·8	67·2	67·1
April	73·1	72·9	65·2	65·1
May	73·1	72·3	65·9	65·7
June	73·9	72·9	66·7	66·5
July	75·6	74·8	65·2	65·2
August	74·7	74·1	63·0	62·8
September	74·0	73·4	62·7	62·6
October	73·3	72·7	64·0	63·8
November	71·8	71·6	64·0	63·8
December	72·0	71·3	63·1	63·0
Total	74·3	73·6	65·5	65·3

Here we find the difference between the two in 1891 to have been 0·7, and in 1892 only 0·2. Looking at the monthly figures we find that the difference in January, 1891, was 0·2, in February Silver fell 3·9, but the Rupee fell 4·2, *i.e.*, the Rupee fell first. In March Silver receded 1·1, the Rupee 0·7, *i.e.*, the Rupee having had a start, Silver fell in sympathy. In April the normal differ-

ence of 0·2 was regained. In May Silver remained steady, but the Rupee fell 0·6, *i.e.*, the Rupee fell first. Silver would have followed the Rupee, but other influences came into play, and Silver rose 0·8 in June, and the Rupee being forced to follow rose 0·6. In July the same influences continuing, Silver rose 1·7, and the Rupee following rose 1·9. In August the Rupee dropped to 74·1, but Silver only to 74·7; in September and October both dropped 0·7 each month, the Rupee having already had the start. In November the Rupee fell 1·1, and Silver 1·5, Silver thus arriving at its normal condition of 0·2 higher than the Rupee. In December Silver rose 0·2, but the Rupee did not respond, and fell 0·3, necessitating a heavier fall in January, 1892, in Silver 1·6, than in the Rupee, 1·2. During the other months of 1892 a difference of 0·1 or 0·2 was the normal state, and no particular inference can be drawn. The inference, however, derived from the year 1891 is that the Rupee dominated Silver in regulating the fall in Gold price, and Silver dominated the Rupee in regulating any rise in Gold price.

The reason for this is perfectly intelligible, though at first sight it appears impossible. Before the closure of the mints the balance of trade in India was for the most part paid for by Council Bills and the remittance of Silver to India for coinage purposes. This remitted Silver was therefore equivalent to a remittance of Rupees, and the cost of the Rupee consequently regulated the value of the Silver when laid down at the mints. The Gold price of the Rupee itself was dependent on the amount it fetched at the auction sales of Council Bills. This price was obviously the lowest price at which it was obtainable, and competition only came into play in a very small degree, because unless it was profitable to remit by means of Council Bills, the remittance was made in Silver. But the advantages of remittance of Council Bills is readily intelligible; it avoided risk and a considerable amount of trouble, just as it was advantageous to pay for exports by the remittance of Silver rather than by merchandise. To this extent competition existed; but even this competition was unable to procure a rise beyond a certain point, provided that the price of Silver did not rise, because prices in India had to be considered. The open mints of India attracted silver, *i.e*, currency, to the country, inflated the currency, and Rupee prices rose; certain of India's commodities could therefore only be exported if assisted by a fall in the Gold price of the Rupee. Bids for Council Bills were accordingly regulated, and the price of Silver had to follow suit, or otherwise it would have been unprofitable to import it into India. The demand for India represented about one-third of the production, and therefore regulated

its general price. Had Silver fallen first, the whole of the remittance to India would have been made in it, and Council Bills would have been neglected. It seems, however, that both fell almost simultaneously, the Rupee taking the lead. When the price of Silver rose for causes independent of the Rupee, the Rupee was forced to follow suit, because the high priced Silver, as compared with the Rupee, would have been unprofitable to export to India, and the competition for Council Bills would have become keen, and have necessarily placed the two on a par. The Rupee itself probably did not at any time take the lead in a rise, because a falling Rupee was necessary to Indian exporters under the strain of rising Rupee prices.

The inference derived from the above is that the open mints of India attracted Silver beyond the wants of the country, and inflated the currency, causing Silver prices to rise; that this rise necessitated a fall in the Gold price of the Rupee, which was rendered possible by the method of the payment of India's Gold debt, under a system of auction sales; that this necessity to continue the fall in the Gold price of the Rupee forced a fall also in the Gold price of Silver, and that consequently a very large share of the currency troubles of the world during the last twenty-five years, *i.e.*, since the demonetization of Silver, has been due to India's open mints, coupled with her system of the payment of her Gold debt.

XI.—*The Closure of the Mints.*

The question whether India did wisely in closing her mints to the free coinage of Silver is one that still carries a considerable difference of opinion, and there are many who continue to hold that the measure was an unwise one, and should never have been adopted. Let us therefore glance at the effects produced by the action taken. In the first place, not a trace of anything prejudicial to the welfare and prosperity of the country is as yet apparent on the surface, and all that can be seen appears to be of a beneficial and salutary character. India is no longer the refuse sink of the world for Silver, and it is difficult to estimate to what extent the circulation of the country would have expanded and to what height prices would eventually have risen if the mints had not been closed. There is no doubt that the fluctuations in the rate of exchange from 1874 onwards caused considerable difficulties in the management of the trade of the country, though the continuous fall in the Gold value of the Rupee must for a time have worked beneficially for exporters; but this obviously led to the increase of the circulation, and the consequent rise in prices, and though this rise

was apparently not felt in the exports for many years, still the high prices of 1889 to 1892 were beginning to have a deterrent effect on exports, and, within a few years, with open mints into which Silver was poured, the external trade of the country would have suffered severely. The closure of the mints put a stop to this undue expansion of the currency, and the rise in prices was checked. Exchange, at the same time, when left to itself, was fairly steady from January, 1895, to November, 1896, with a gradual progressive rise, and in spite of the unfortunate short rainfall of the present year, it appears probable that by the end of the present cold season the Rupee will have nearly reached the maximum point it can reach under the present official order, *i.e.*, 16*d.*, and had the country been blessed with a normal rainfall, prices would probably also have readjusted themselves sufficiently to encourage and increase the export trade of the country. The present difficulty in this respect is, however, only temporary, and assuming that the mints remain closed, prices will resume their normal level, falling as the circulation contracts; and the resultant trade and prosperity of the country will prove the immense benefit derived by the action taken. When the Rupee reaches its maximum limit, 16*d.*, or whatever figure it is decided to fix it at, it will be necessary to make it permanent by the establishment of a Gold standard, which can be done without difficulty, and without interfering with the interests of England or any other country by the imitation of the simple process adopted by Java, namely, the abolition of the present system of the auction sales of Council Bills, and making Rupees exchangeable for Gold or *vice versâ* at the rate fixed at some specified bank or other place in London, a small reserve of Gold being held to cover any possible balance of trade against India.

India's interests would of course be best served by the establishment of universal monometallism of either metal, or by bimetallism, and as the former is absolutely impracticable, she lends her weight to the latter. Bimetallism is also thought to be impracticable by many, because England declines to become a partner in it. Every one, even the most enthusiastic of bimetallists, must recognize that there are difficulties in England accepting the doctrine, and recent events have shown that its establishment is as far distant as ever if England's co-operation is a *sine quâ non*. But there are many, and an important section, who consider that England's partnership is not a necessity to success, and this certainly appears to be the more sensible view to adopt. If the United States, the Latin Union, and India jointly agreed to the free coinage of Silver, there would be every chance, in fact almost certainty, of success, and under such conditions India

would no doubt be willing to re-open her mints. It seems therefore that the proper course for bimetallists to take now is to do their utmost to bring about such a result, and with the powerful Silver party in the States, and the anxiety of France to place her enormous stock of undervalued Silver on a par basis, it would appear that such a result is far from impossible or even improbable, provided that England and Germany will give guarantees to assist all in their power in the maintenance of the system, and this would probably be possible by some device regulating the rate of discount when necessary. Until, however, bimetallism on some sound and assured basis is established, India should, and probably will, keep her mints closed.

APPENDIX A.—*The Production and Manufactures of India; relative importance of each*, 1893.

1 Crop.	2 British India and Mysore.	3 Yield per Acre.	4 Total Production.	5 Average Price per Cwt.	6 Value of Production.	7 Native States without Mysore.	8 Production.	9 Value of Production.	10 Total Value Production all India.	11 Percentage of each Total.	12 Percentage of each taken in Statement of Prices.
SECTION I.	acres.	lbs.	cwt.	rupees.	rupees.	acres.	cwt.	rupees.	rupees.		
1. Rice	69,115,741	1,122	692,391,619	4·26	2,94,95,88,297	6,000,000	60,107,143	25,60,56,429	3,20,56,44,726	34·5	30
2. Wheat	22,219,115	787	156,128,959	3·05	47,61,93,325	5,164,000	36,286,321	11,06,73,279	58,68,66,604	6·3	5
3. Ragi	5,940,571	1,011	53,624,261	5·00	26,81,21,305	2,000,000	17,875,000	8,93,75,000	35,74,96,305	3·9	2
4. Jawar	20,181,951	576	103,792,891	2·53	26,25,96,014	8,000,000	41,142,857	10,40,91,428	36,66,87,442	4·0	3
5. Bajra	10,245,045	463	42,352,284	2·72	11,51,98,212	6,000,000	24,803,571	6,74,66,713	18,26,64,925	2·0	2
6. Gram	11,030,812	549	54,070,677	3·20	17,30,26,166	5,000,000	24,508,929	7,84,28,573	25,14,54,739	2·7	2
7. Maize	5,274,749	784	39,923,243	2·31	8,52,92,691	2,000,000	14,000,000	3,23,40,000	11,76,32,691	1·3	1
8. Barley	4,854,530	664	28,720,428	2·33	6,70,58,397	1,000,000	5,928,571	1,38,13,570	8,08,71,967	0·9	1
9. Other grains and pulses	37,410,045	626	209,095,430	3·33	69,62,87,782	10,000,000	55,892,857	18,61,23,214	88,24,10,996	9·5	5
10. Sugar	3,069,106	2,301	63,053,687	5·56	35,05,78,500	1,000,000	20,544,643	11,42,28,215	46,48,06,715	5·0	4
11. Spices	1,102,104	150	1,476,032	20·64	3,04,65,700	300,000	401,786	82,92,863	3,87,58,563	0·4	1
12. Miscellaneous food	2,858,833	550	13,989,805	2·50	3,49,74,712	1,500,000	7,366,071	1,84,15,177	5,33,89,889	0·6	1
13. Orchards and gardens	2,856,532	—	—	—	—	1,500,000	—	—	—	—	—
14. Meat	—	—	—	—	—	—	—	—	—	—	2
15. Ghee	—	—	—	—	—	—	—	—	—	—	1
Total food	196,159,134	—	1,458,679,316	—	5,50,93,81,101	19,464,000	308,857,749	1,07,93,04,461	6,58,86,85,562	71·1	60
SECTION II.											
16. Tea	391,120	345	1,204,789	59·70	7,19,23,903	7,837	18,713	11,19,166	7,30,43,069	0·8	1
17. Coffee	260,520	142	330,302	71·80	2,37,15,684	6,242	40,559	29,12,136	2,66,27,820	0·3	1
18. Cotton	10,509,263	92	8,632,609	21·83	18,84,49,854	5,562,500	4,479,911	9,77,96,458	28,62,46,312	3·1	3
19. Jute	2,230,570	1,463	29,136,821	6·42	18,70,58,391	—	—	—	18,70,58,391	2·0	2
20. Indigo	1,535,643	16·4	224,862	318·20	7,05,51,088	100,000	14,643	46,59,403	7,52,10,491	0·8	2
21. Opium	556,255	14·1	70,029	819·01	5,73,60,754	381,444	48,021	3,93,34,001	9,66,94,755	1·0	2
22. Tobacco	1,220,066	1,560	16,993,777	11·00	18,69,31,547	400,000	5,571,429	6,12,85,719	24,82,17,266	2·6	2
23. Linseed	4,322,324	334	12,889,788	5·48	7,06,36,038	4,405,000	13,136,336	7,19,87,138	14,26,23,176	1·6	1
24. Til	3,360,688	325	9,752,005	6·55	6,38,75,633	1,000,000	2,901,786	1,90,06,698	8,28,82,331	0·9	1
25. Other seeds	7,420,828	380	25,211,702	7·65	19,28,69,520	5,129,000	17,401,964	13,31,25,025	32,59,94,545	3·5	2

A *Contd.*—*The Production and Manufactures of India; relative importance of each*, 1893.

1 Crop.	2 British India and Mysore.	3 Yield per Acre.	4 Total Production.	5 Average Price per Cwt.	6 Value of Production.	7 Native States without Mysore.	8 Production.	9 Value of Production.	10 Total Value Production all India.	11 Percentage of each Total.	12 Percentage of each taken in Statement of Prices.
SECTION II—*Contd.*	acres.	lbs.	cwt.	rupees.	rupees.	acres.	cwt.	rupees.	rupees.		
26. Miscellaneous	1,486,466	400	5,308,807	5·50	2,91,98,438	600,000	2,142,857	1,17,85,713	4,09,84,151	0·4	3
27. Fodder	1,914,199	—	—	—	—	800,000	—	—	—	—	—
Total other products	35,217,942	—	109,755,491	—	1,14,25,70,850	18,392,023	45,756,222	44,30,11,457	1,58,55,82,307	17·0	20
SECTION III.											
28. Cotton goods.....	at 175 per cent. of net value of raw cotton retained in country after deducting one-sixth of production for seed								18,84,17,759	2·0	2
29. Jute „	„ 150 „ jute „ „								10,59,61,609	1·1	2
30. Flour mills	Published figures of out-turn in mills belonging to joint stock companies. Excluding out-turn by hand, &c.								1,61,30,805	0·2	—
31. Oils.....									1,05,82,154	0·1	2
32. Silk goods									72,60,669	0·1	1
33. Timber									1,19,49,828	0·1	2
34. Other factories									3,56,26,593	0·4	1
35. Coal	From published statistics								86,07,860	0·1	1
36. Raw silk.....	.....								—	—	1
	Live Stock in India (British).	Number.	Average Value.	Total Value.		Grand Total.					
			rupees.	rupees.		rupees.					
37. „ wool											1
38. Hides, raw and tanned	Bulls, bullocks, and cows	64,185,444	26	1,66,88,21,544	Plus estimate of 20 per cent. for native States =		Yielding an annual value of say 20 per cent. =		72,10,80,728	7·8	3
39. Skin, raw and tanned	Buffaloes	15,784,700	60	94,70,82,000							3
	Calves	19,828,560	15	29,74,28,400							3
40. Manure (animal bones).....	Sheep.....	21,087,624	3¼	6,85,34,778							1
	Goats.....	18,107,550	1¼	2,26,34,437							
	Total	—	—	3,00,45,01,159	60,09,00,232	3,60,54,01,391					
					Total.....				1,10,56,17,550	11·9	20
					Grand total				9,27,98,85,419	100·0	100

B.—*Area of Cultivation in*

Province.	Rice.	Wheat.	Barley.	Jawar.	Bajra.	Ragi.
Madras	6,710,212	18,621	3,343	4,570,378	2,857,900	1,622,563
Bombay	2,418,937	2,459,131	59,898	7,879,059	4,845,030	639,774
Bengal	38,200,300	1,620,200	1,048,200	460,300*	—	802,700
North-West Provinces and Oudh	7,902,582	4,894,796	2,059,315	527,831	560,758	329,031
Punjab	816,341	8,300,826	1,581,215	2,116,268	1,762,096	11,454
Central Provinces	4,473,344	3,934,555	14,332	1,285,707	28,306	16,315
Burma	6,399,151	20,969	—	639,286	53,235	—
Assam	1,322,131	18	—	—	—	—
Berar	37,050	928,481	5	2,105,016	70,734	—
Coorg, Ajmere, and Manpur	76,512	38,541	87,632	72,673	21,781	1,609
Mysore	759,181	2,977	590	525,433	45,205	2,517,125
Native States (without Mysore)	6,000,000	5,164,000	1,000,000	8,000,000	6,000,000	2,000,000
Total	75,115,741	27,383,115	5,854,530	28,181,951	16,245,045	7,940,571

	Sugar.	Cotton.	Jute.	Indigo.	Opium.	Coffee.
Madras	140,613	1,723,985	—	442,439	17	59,156
Bombay	86,959	3,187,588	—	13,303	—	61
Bengal	1,083,400	201,200	2,228,200	614,200	291,700	—
North-West Provinces and Oudh	1,322,368	1,311,932	—	364,262	251,541	—
Punjab	327,604	890,144	—	101,144	9,726	—
Central Provinces	35,988	724,164	—	—	—	—
Burma	13,587	147,963	329	190	—	595
Assam	17,432	3,528	2,041	—	—	—
Berar	5,315	2,184,770	—	77	—	—
Coorg, Ajmere, and Manpur	723	63,464	—	28	3,271	63,689
Mysore	35,117	70,525	—	—	—	137,019
Native States (without Mysore)	1,000,000	5,562,500	—	100,000	381,444	6,242
Total	4,069,106	16,071,763	2,230,570	1,635,643	937,699	266,762

* A portion of

each Province, 1893-94.

Maize.	Gram.	Other Grains and Pulses.	Linseed.	Til.	Other Seeds.	Spices.
71,483	131,130	5,573,282	40,358	777,573	1,063,140	373,269
146,458	854,252	3,090,100	381,919	466,684	1,500,245	213,767
2,031,600	1,397,200	5,895,800	777,200	520,000	2,956,600	236,900
1,450,988	3,533,118	15,651,429	742,062	204,542	204,121	63,643
1,312,196	3,135,385	2,810,395	41,849	232,220	910,650	26,376
58,968	1,085,615	3,101,940	1,759,285	532,671	282,872	35,664
131,673	42,108	165,237	295	424,590	1,875	17,877
—	—	67,477	—	17	197,471	—
978	256,236	366,160	578,428	85,309	87,792	31,629
67,769	35,629	40,104	869	41,620	3,694	795
2,636	560,139	648,121	59	75,462	222,368	102,184
2,000,000	5,000,000	10,000,000	4,405,000	1,000,000	5,129,000	300,000
7,274,749	16,030,813	47,410,045	8,727,324	4,360,688	12,559,828	1,402,104

Tea.	Tobacco.	Others. *Food.*	Others. *Non Food.*	Orchards.	Fodder.	Total.
5,784	125,062	—	366,119	650,093	83,518	27,410,038
—	98,493	86	155,571	176,955	33,795	28,708,070
110,800	730,500	1,704,200	513,500	889,800	129,700	64,444,200
8,418	85,984	243,885	180,498	308,705	721,802	42,923,611
9,237	68,153	331,168	72,407	123,101	655,994	25,645,949
—	22,180	278,994	73,419	94,107	282,261	18,120,687
883	55,524	211,165	48,080	266,305	637	8,641,554
255,998	13	36,484	32,097	184,801	—	2,119,508
—	20,660	2,044	14,243	16,202	—	6,791,129
—	38	11,267	2,382	201	1,258	635,549
—	13,454	39,540	28,150	146,262	5,234	5,936,781
7,837	400,000	1,500,000	600,000	1,500,000	800,000	67,856,023
398,957	1,620,066	4,358,833	2,086,466	4,356,532	2,714,199	299,233,099

this is bajra.

C.—*Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	1	2	3	4	5	6	7	8
	Rice.							
Name of Commodity.	Monghyr, Calcutta.	Common, Bengal, Eastern Division.	Common, Calcutta.	Common, Patna.	Common, Bengal, Deltaic Division.	Common, Bengal, Orissa Division.	Common, Madras, S. E. Coast Division.	Common, Madras, Salem.
Average rupee Price, 1871 = 100.	Rs. 2,2,6 per maund.	22,59 seers per rupee.	20 seers per rupee.	22,89 seers per rupee.	21,39 seers per rupee.	29,66 seers per rupee.	19,92 seers per rupee.	19,69 ers per rupee.
1861.....	87	66	101	81	80	89	128	155
'62.....	81	70	101	65	76	90	150	157
'63.....	84	77	103	61	78	98	138	142
'64.....	110	87	131	65	93	88	137	148
'65.....	131	127	157	99	127	135	158	172
'66.....	194	137	174	131	167	303	172	191
'67.....	116	101	118	100	110	181	214	245
'68.....	116	95	133	65	108	95	161	186
'69.....	113	114	131	112	108	123	162	177
1870.....	101	99	126	86	102	100	145	157
'71.....	100	100	100	100	100	100	100	100
'72.....	105	84	105	102	103	104	115	106
'73.....	117	93	164	130	107	91	113	116
'74.....	162	157	167	144	160	122	148	138
'75.....	133	118	139	96	127	116	129	121
'76.....	123	127	162	130	108	111	170	157
'77.....	162	148	169	126	139	168	250	280
'78.....	195	196	189	156	189	217	223	235
'79.....	182	183	190	152	181	189	169	190
1880.....	131	112	139	121	123	144	138	156
'81.....	95	84	118	96	93	98	125	126
'82.....	96	86	125	104	93	99	116	126
'83.....	123	106	126	129	108	111	116	122
'84.....	151	142	169	162	148	149	132	134
'85.....	163	145	200	139	152	162	150	159
'86.....	124	137	139	122	126	150	130	142
'87.....	116	118	111	101	107	134	134	134
'88.....	126	162	120	122	113	141	133	137
'89.....	156	155	148	152	152	174	149	140
1890.....	164	145	148	131	148	151	171	152
'91.....	159	145	150	131	142	161	180	184
'92.....	184	190	184	164	182	223	199	203
'93.....	200	212	201	140	191	202	194	196
'94.....	188	191	198	145	173	190	164	169
'95.....	160	141	165	124	138	137	165	165
Total	4,748	4,450	5,101	4,084	4,452	4,946	5,378	5,618
Average	135	127	146	117	127	141	153	161

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	9	10	11	12	13	14	15	16 to 30
	Rice.							
Name of Commodity.	Common, N.W.P., Eastern Division.	Common, N.W.P., Central Division.	Common, Burma, Rangoon.	Common, Burma, Tennasserim Division.	Common, Central Provinces, Nagpur.	Common, Central Provinces, Jubbulpore.	Common, Hyderabad, Bolaram.	Aggregate of 1 to 15.
Average rupee, Price 1871 = 100.	16,03 seers per rupee.	17,07 seers per rupee.	18,0 seers per rupee.	23,23 seers per rupee.	18,6 seers per rupee.	16,06 seers per rupee.	9,94 seers per rupee.	
1861	91	127	163	97	93	70	72	1,500
'62	88	102	108	101	93	115	70	1,467
'63	94	102	108	101	88	115	88	1,477
'64	101	121	123	101	144	123	101	1,673
'65	128	140	123	105	169	146	90	2,007
'66	139	123	108	97	206	196	116	2,454
'67	108	123	136	102	206	143	104	2,107
'68	106	120	136	103	210	144	92	1,870
'69	130	140	149	105	173	174	96	2,007
1870	104	120	163	102	118	151	95	1,769
'71	100	100	100	100	100	100	100	1,500
'72	109	122	105	124	103	111	104	1,602
'73	115	130	133	127	106	106	100	1,748
'74	125	131	171	136	96	119	86	2,062
'75	86	107	115	112	102	92	83	1,676
'76	85	94	108	113	107	87	90	1,772
'77	109	127	127	128	127	109	146	2,315
'78	153	188	163	153	157	149	130	2,693
'79	119	143	169	171	144	128	107	2,417
1880	95	118	145	180	126	99	103	1,930
'81	89	119	129	142	100	89	104	1,607
'82	91	115	123	115	95	96	106	1,586
'83	104	124	140	137	93	91	102	1,732
'84	121	139	141	150	126	107	93	2,064
'85	110	118	120	134	121	93	90	2,056
'86	106	124	126	146	135	122	97	1,926
'87	107	132	139	145	152	121	99	1,850
'88	112	144	147	181	150	146	105	2,039
'89	132	147	147	191	160	159	115	2,277
1890	129	141	151	176	187	129	106	2,229
'91	130	158	169	176	149	112	99	2,245
'92	143	153	172	206	168	127	124	2,622
'93	135	155	132	181	158	115	104	2,516
'94	131	155	120	168	154	116	97	2,359
'95	128	147	120	160	156	111	94	2,111
Total	3,953	4,549	4,729	4,766	4,772	4,211	3,508	69,265
Average	113	130	135	136	136	120	100	1,979

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	31	32	33	34	35	36	37	38
	Wheat.					Jawar.		
Name of Commodity.	Common, N.W.P., Cawnpore.	Common, Punjab, Delhi.	Common, Central Provinces, Nagpur.	1st Quality, Central India, Nusseerabad.	Flour, Bombay, Poona.	Bombay.	Madras, Salem.	Hyderabad, Bolaram.
Average rupee, Price, 1871 = 100.	24,11 seers per rupee.	21,87 seers per rupee.	18,7 seers per rupee.	Rs. 2,75 per maund.	Rs. 4,75 per maund.	Rs. 2,53 per maund.	44,23 seers per rupee.	13,69 seers per rupee.
1861	139	148	65	119	56	83	211	51
'62	87	83	89	113	68	84	211	64
'63	84	86	117	101	91	115	192	85
'64	122	102	156	100	99	138	165	90
'65	143	110	144	121	108	119	211	73
'66	171	112	208	122	109	142	273	101
'67	143	103	208	112	93	136	383	79
'68	120	104	141	111	87	102	269	71
'69	209	187	185	229	117	135	237	69
1870	156	169	141	152	127	112	198	74
'71	100	100	100	100	100	100	100	100
'72	125	105	97	98	104	104	96	81
'73	145	115	86	99	85	85	192	76
'74	139	114	78	92	69	78	196	49
'75	103	102	74	83	81	79	175	55
'76	96	89	82	69	92	91	142	66
'77	149	118	98	84	114	162	534	136
'78	172	155	144	121	137	159	394	141
'79	169	155	157	126	146	144	279	104
1880	130	125	109	104	118	98	213	73
'81	117	112	91	86	101	72	163	51
'82	129	117	95	84	88	83	158	47
'83	129	115	93	84	86	85	141	49
'84	109	109	78	76	85	93	163	68
'85	107	97	81	66	77	88	208	62
'86	122	115	99	75	83	91	186	56
'87	146	148	110	112	96	90	154	62
'88	148	148	111	111	97	101	163	69
'89	144	126	116	94	97	97	169	66
1890	156	133	112	96	95	91	192	69
'91	166	157	129	112	91	93	243	68
'92	169	152	157	116	110	116	283	87
'93	156	135	124	105	101	118	243	94
'94	135	106	113	90	85	117	220	88
'95	149	128	124	101	81	107	203	68
Total	4,784	4,280	4,112	3,664	3,374	3,708	7,660	2,642
Average	137	122	117	105	96	106	219	75

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100

No. of Article	39	40	41	42	43	44	45	46
Name of Commodity.	Ragi.		Gram.		Bajra.		Maize.	Barley.
	Madras, South-East Coast Division.	Mysore.	Punjab, Central Division.	North-West Provinces, Central Division.	Bombay, Deccan Division.	Madras, Salem.	Chota Nagpur.	Delhi.
Average rupee, Price, 1871 = 100.	40,0 seers per rupee.	55,6 seers per rupee.	23,53 seers per rupee.	25,55 seers per rupee.	17,51 seers per rupee.	34,16 seers per rupee.	31,86 seers per rupee.	30,79 seers per rupee.
1861	154	182	135	126	68	173	114	181
'62	169	200	59	77	78	162	116	71
'63	152	182	54	74	120	141	159	70
'64	143	205	71	106	175	125	159	91
'65	164	216	85	111	139	158	152	108
'66	203	265	81	118	153	208	199	99
'67	272	505	113	95	110	275	118	99
'68	199	331	139	92	70	197	76	99
'69	179	177	226	254	84	169	100	188
1870	161	152	156	124	104	141	86	127
'71	100	100	100	100	100	100	100	100
'72	111	121	114	104	104	100	100	100
'73	132	150	87	117	81	141	87	111
'74	165	185	75	123	63	148	142	109
'75	146	210	80	98	70	135	98	100
'76	197	378	65	74	98	170	90	86
'77	407	735	72	109	171	458	93	98
'78	305	505	149	170	158	297	122	151
'79	211	224	160	167	158	210	120	154
1880	161	187	132	122	98	172	87	119
'81	131	221	121	112	59	134	80	107
'82	120	261	86	96	68	140	87	113
'83	120	198	73	90	75	123	103	111
'84	129	202	68	95	90	137	132	113
'85	163	241	77	90	102	172	125	84
'86	135	202	86	90	85	161	103	101
'87	138	149	109	106	79	125	97	149
'88	140	165	117	134	93	138	139	150
'89	147	187	90	110	105	146	128	127
1890	168	198	104	125	92	142	116	148
'91	205	262	120	148	91	183	140	158
'92	243	291	122	122	112	224	155	137
'93	227	242	96	111	88	205	164	113
'94	186	222	69	108	98	172	156	102
'95	160	212	96	126	85	152	163	129
Total	6,143	8,463	3,587	4,024	3,524	6,034	4,206	4,103
Average	175	242	102	115	101	172	120	117

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	47	48	49	50	51	52	53	54
	Other Grains.					Vegetables.	Sugar.	
Name of Commodity.	Arhar, Allahabad.	Arhar, N.W.P., Sub-Montano Division.	Mung Dal, Lucknow.	Masur, Lucknow.	Chenna, Cawnpore.	Potatoes. Bombay.	Gurputty, Calcutta.	Dhulloah, Calcutta.
Average rupee, Price, 1871 = 100.	19,95 seers per rupee.	20,50 seers per rupee.	Rs. 3,11,7 per maund.	Rs. 2,3,2 per maund.	Rs. 2,0,6 per maund.	Rs. 3,4,3 per maund.	Rs. 8,7 per maund.	Rs. 7,9 per maund.
1861	63	86	79	—	—	74	80	90
'62	64	70	83	—	—	80	92	97
'63	68	65	110	—	—	64	90	89
'64	77	89	150	—	—	97	100	96
'65	78	103	151	—	—	119	89	92
'66	110	111	135	—	—	120	95	96
'67	74	91	111	—	—	185	83	90
'68	69	83	91	—	—	271	86	91
'69	122	150	116	—	—	163	90	97
1870	92	96	108	—	—	154	91	101
'71	100	100	100	100	100	100	100	100
'72	110	113	113	100	100	106	94	99
'73	126	113	81	100	100	99	97	89
'74	136	148	74	100	100	106	84	90
'75	102	124	73	100	100	101	83	90
'76	73	85	67	106	96	110	82	84
'77	94	111	122	165	183	126	102	109
'78	211	212	190	218	223	227	102	106
'79	181	190	120	195	218	129	105	113
1880	103	130	90	125	147	110	105	115
'81	97	112	93	123	136	123	101	106
'82	93	117	95	146	123	110	99	106
'83	81	106	90	139	112	98	98	108
'84	92	121	88	160	118	101	92	101
'85	99	108	85	164	121	101	93	99
'86	97	89	85	161	120	111	94	100
'87	103	98	110	167	151	103	90	94
'88	111	103	129	189	157	106	77	85
'89	102	97	119	176	143	136	92	106
1890	102	106	126	194	173	235	102	106
'91	111	125	152	194	169	135	89	99
'92	95	108	123	188	153	143	92	98
'93	95	107	94	164	124	100	105	112
'94	98	100	106	171	133	103	98	104
'95	114	135	111	178	150	73	87	94
Total	3,543	3,902	3,770	3,823	3,450	4,319	3,267	3,452
Average	101	111	108	153	138	123	93	99

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100

No. of Article	55	56	57	58	59	60		
	Sugar.		Spices.		Meat.		Total Food	
Name of Commodity.	Jaggery Cane, Madras.	Jaggery, Palmyra, Madras.	Ginger. Export Accounts.	Ghee. Bombay.	Mutton, Bombay.	Beef, Bombay.	Total.	Average Index Number.
Average rupee, Price, 1871 = 100.	Rs. 23,6 per candy.	Rs. 16,5 per candy.	Rs. 0·080 per lb.	Rs. 32,58 per maund.	Rs. 0·52 per seer.	Rs. 0·49 per seer.		
1861	116	145	127	94	65	45	6,069	105
'62	120	151	182	96	71	43	5,814	100
'63	123	155	186	82	77	45	5,931	102
'64	119	148	134	104	50	47	6,604	114
'65	123	155	97	127	55	58	7,423	128
'66	130	165	106	138	112	95	8,885	153
'67	119	148	105	135	117	92	8,408	145
'68	92	110	107	124	117	92	7,281	126
'69	137	172	102	125	110	98	8,241	142
1870	116	144	97	125	125	108	7,083	122
'71	100	100	100	100	100	100	6,000	100
'72	101	127	140	120	96	103	6,390	106
'73	89	101	186	105	83	90	6,744	112
'74	89	108	215	89	117	92	6,497	125
'75	89	99	199	106	107	80	6,494	108
'76	93	108	186	108	102	88	6,917	115
'77	135	145	186	117	85	86	9,934	166
'78	112	139	157	116	98	92	10,869	181
'79	119	148	204	113	87	72	9,512	160
1880	113	144	169	110	83	80	7,532	126
'81	112	136	165	110	90	76	6,552	109
'82	105	127	195	122	94	82	6,558	109
'83	102	116	221	128	96	88	6,722	112
'84	85	108	227	136	102	84	7,490	125
'85	89	102	185	132	98	80	7,508	125
'86	94	117	155	131	96	84	7,176	120
'87	88	101	205	131	96	86	7,193	120
'88	98	116	179	139	94	80	7,765	130
'89	113	139	132	142	96	76	8,172	136
1890	90	100	124	135	96	82	8,266	138
'91	91	105	197	126	98	77	8,624	144
'92	107	113	312	132	96	81	9,681	161
'93	119	135	403	134	96	68	9,210	153
'94	93	102	292	128	84	80	8,477	141
'95	99	99	256	124	54	48	7,928	132
Total	3,720	4,428	6,233	4,148	3,243	2,778	266,950	—
Average	106	127	178	120	93	79	—	—

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	61	62	63	64	65	66	67	68	69
	Tea and Coffee.		Cotton.			Jute.		Indigo.	
Name of Commodity.	Tea.	Coffee.	Dharwar.	Broach.	Dhollera.	Picked.	Double Triangle, M.	Bengal, Good.	Consuming.
Average rupee Price. 1871 = 100.	Rs. 0·85 per lb.	Rs. 26,31 per cwt.	Rs. 217 per candy.	Rs. 222 per candy.	Rs. 203 per candy.	Rs. 33,12,3 per bale.	Rs. 24,9 per bale.	Rs. 307,5 per maund.	Rs. 253,7 per maund.
1861	102	93	81	80	76	46	45	89	78
'62	89	104	188	145	153	57	56	102	92
'63	86	105	270	241	246	68	75	80	85
'64	94	105	292	264	288	71	71	80	71
'65	82	96	190	166	171	63	57	83	76
'66	61	100	176	149	167	67	72	86	76
'67	104	100	112	109	105	57	75	92	78
'68	98	94	105	105	108	55	72	103	93
'69	96	102	141	134	138	58	76	105	100
1870	99	103	125	125	122	107	97	102	100
'71	100	100	100	100	100	100	100	100	100
'72	103	108	119	121	116	87	88	96	97
'73	104	128	97	106	99	70	74	89	82
'74	108	176	87	92	86	84	103	92	89
'75	106	151	88	97	85	68	88	85	77
'76	108	151	80	86	84	74	92	88	77
'77	108	171	89	94	94	87	107	84	77
'78	107	170	93	91	96	82	108	79	73
'79	96	174	95	105	103	78	106	100	95
1880	80	169	98	111	103	91	122	96	96
'81	86	161	88	100	94	82	111	92	96
'82	78	152	95	102	96	61	85	92	92
'83	79	154	80	92	84	65	93	97	91
'84	76	153	88	100	93	69	98	92	87
'85	72	140	92	100	99	61	94	94	85
'86	72	138	84	96	91	71	90	73	87
'87	69	192	93	103	96	77	98	68	76
'88	66	200	97	109	103	89	113	76	89
'89	60	222	100	110	107	106	133	72	84
1890	58	239	98	107	99	86	109	71	74
'91	60	231	81	93	87	90	106	69	68
'92	62	240	87	94	88	121	150	85	96
'93	63	264	99	110	103	112	139	95	104
'94	65	268	87	97	91	112	148	89	90
'95	67	289	91	103	95	102	136	91	93
Average	2,964	5,543	3,986	4,037	3,966	2,774	3,387	3,087	3,024
Total	85	158	114	115	113	79	97	88	86

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	70	71	72	73	74	75	76	77
	Opium.		Tobacco.		Seeds.			
Name of Commodity.	Behar.	Malwa.	Central India, Nusseerabad.	Bombay.	Linseed, Bold.	Til.	Rape, Yellow, Mixed.	Castor.
Average rupee, Price. 1871 = 100.	Rs. 1331 per chest.	Rs. 1433 per chest.	Rs. 0·51 per seer.	Rs. 1,01 per seer.	Rs. 4,7·4 per maund.	Rs. 6,01 per cwt.	Rs. 4,75 per maund.	Rs. 4,93 per cwt.
1861	139	107	66	56	84	86	107	97
'62	111	111	64	61	87	88	86	97
'63	105	110	85	61	92	91	80	97
'64	77	101	83	94	92	91	88	95
'65	74	100	92	141	98	85	80	86
'66	101	117	108	116	112	112	76	96
'67	100	111	66	138	107	95	67	109
'68	105	103	45	125	105	100	81	109
'69	97	100	86	118	108	100	92	93
1870	85	100	68	114	103	99	98	102
'71	100	100	100	100	100	100	100	100
'72	108	94	94	100	106	100	107	114
'73	98	93	96	99	105	100	96	107
'74	93	91	128	93	111	100	82	93
'75	95	88	119	84	92	96	79	91
'76	98	90	98	83	94	100	89	88
'77	98	95	94	93	102	119	99	123
'78	96	119	98	111	106	127	101	137
'79	89	115	98	103	112	121	100	100
1880	102	122	98	87	104	117	89	115
'81	102	112	98	84	96	114	83	95
'82	95	100	90	84	85	100	86	92
'83	95	86	79	83	87	112	104	94
'84	98	87	88	84	96	120	91	92
'85	96	83	88	83	96	116	77	89
'86	88	84	81	84	100	110	75	98
'87	82	84	79	83	96	112	77	89
'88	83	93	70	85	98	120	81	102
'89	88	92	70	83	109	125	103	137
1890	80	82	96	79	104	122	93	127
'91	79	81	98	79	104	120	98	109
'92	91	83	104	80	119	131	96	114
'93	86	82	106	87	123	132	98	116
'94	94	87	98	76	127	130	94	92
'95	107	96	106	70	126	135	104	96
Total	3,335	3,399	3,137	3,201	3,586	3,826	3,157	3,598
Average	95	97	90	91	102	109	90	103

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	78	79	80	81	82	83	84
	Miscellaneous.						
Name of Commodity.	Saltpetre, 5 per Cent. Refined.	Cutch, Rangoon.	Myrabolams.	Manure, Animal Bones.	Coal.	Raw Silk, Surdales.	Raw Wool.
Average rupee, Price, 1871 = 100.	Rs. 7,4 per maund.	Rs. 6,87 per cwt.	Rs. 3,14 per cwt.	Rs. 25,21 per ton.	Rs. 6 per maund.	Rs. 22,5 per seer.	Rs. 0·335 per lb.
1861	99	119	74	—	133	77	69
'62	105	124	74	—	133	82	100
'63	111	119	79	—	133	83	150
'64	100	120	83	—	133	77	146
'65	82	120	80	—	133	101	107
'66	76	130	90	—	133	106	111
'67	66	164	97	—	133	104	111
'68	72	169	103	—	117	112	91
'69	82	157	113	—	117	112	106
1870	95	122	111	99	100	109	107
'71	100	100	100	100	100	100	100
'72	108	107	96	92	100	100	124
'73	99	103	100	101	100	95	134
'74	84	107	92	127	75	76	142
'75	77	118	118	129	58	58	138
'76	76	133	118	136	58	98	135
'77	93	141	142	127	54	100	126
'78	91	123	136	127	54	78	121
'79	85	143	134	138	54	77	117
1880	93	202	132	149	54	77	136
'81	92	192	120	154	52	80	120
'82	88	191	122	142	52	83	107
'83	82	167	127	191	52	72	101
'84	73	167	134	168	52	66	113
'85	74	164	139	185	52	59	112
'86	81	201	127	191	52	87	113
'87	82	227	112	192	50	83	119
'88	85	230	125	198	48	74	126
'89	89	211	126	209	52	81	137
1890	86	220	139	212	52	81	137
'91	86	221	162	212	49	75	134
'92	94	239	159	202	50	72	136
'93	101	250	165	214	49	86	134
'94	118	265	141	228	51	75	132
'95	124	293	130	236	64	72	132
Total	3,149	5,859	4,100	4,259	2,749	2,968	4,224
Average	90	167	117	164	78	85	121

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	85	86	87	88	89		
Name of Commodity.	Hides and Skins.			Timber.		Total Raw Produce and Materials.	
	Raw Hides, Buffalo, Patna, Slaughtered, Arsenic.	Raw Hides, Cow, Burdwan, Slaughtered.	Raw Skins, Goat, Calcutta.	Bamboos, Calcutta.	Teak, Rangoon.	Total.	Average Index Number.
Average rupee, Price. 1871 = 100.	Rs. 5,94 per lb.	Rs. 49,4 per corge.	Rs. 67,1 per 100.	Rs. 13,14,2 per 100.	Rs. 81,7 per ton.		
1861	100	83	58	—	117	2,361	87
'62	96	83	51	—	126	2,665	99
'63	95	85	67	—	89	2,988	111
'64	100	79	73	—	81	3,049	113
'65	87	77	68	—	107	2,702	100
'66	84	77	72	—	74	2,745	102
'67	87	77	62	—	64	2,590	96
'68	97	86	55	—	133	2,641	98
'69	101	90	79	—	99	2,800	104
1870	112	94	101	—	112	2,911	104
'71	100	100	100	100	100	2,900	100
'72	119	106	107	95	95	3,007	104
'73	122	105	98	93	101	2,894	100
'74	119	101	101	158	115	3,005	104
'75	102	89	101	130	102	2,809	97
'76	101	79	110	158	94	2,876	99
'77	99	75	117	90	84	2,982	103
'78	84	71	110	115	83	2,987	103
'79	105	70	103	143	83	3,042	105
1880	115	79	110	115	86	3,148	109
'81	118	89	106	115	96	3,028	104
'82	112	88	122	115	117	2,924	101
'83	100	96	121	115	123	2,922	101
'84	103	92	108	115	125	2,928	101
'85	103	89	115	122	100	2,879	99
'86	103	79	128	115	101	2,900	100
'87	97	75	129	111	103	2,954	102
'88	94	71	147	126	105	3,103	107
'89	86	66	142	126	108	3,234	112
1890	72	67	140	122	112	3,164	109
'91	72	69	156	122	99	3,110	107
'92	77	75	193	122	98	3,358	116
'93	78	84	166	86	103	3,435	118
'94	85	92	175	130	107	3,451	119
'95	102	110	213	158	107	3,648	126
Total	3,427	2,948	3,904	2,997	3,549	104,140	3,660
Average	98	84	112	120	103	3,051	105

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	90	91	92	93	94	95	96
	Cotton Goods.		Jute Goods.		Oils.		
Name of Commodity.	Yarn, 1, 203.	T. Cloth, 44-inch.	Bags, No. 2, Twill.	Bags for California.	Castor.	Cocoanut.	Silk Piece Goods, Corah No. 1.
Average rupee, Price. 1871 = 100.	8,5 annas per lb.	10,5 annas per lb.	Rs. 23,1 per 100.	Rs. 11,2 per 100.	Rs. 11,3 per maund.	Rs. 17,5 per maund.	Rs. 146,5 per corge.
1861	—	—	77	96	109	—	87
'62	—	—	82	104	114	—	85
'63	—	—	90	115	99	—	84
'64	—	—	99	127	96	—	87
'65	—	—	98	109	91	—	86
'66	—	—	99	106	104	—	91
'67	—	—	94	86	107	—	106
'68	104	—	87	74	109	—	108
'69	96	—	93	81	96	—	107
1870	99	103	113	114	101	—	106
'71	100	100	100	100	100	100	100
'72	101	91	95	102	112	76	104
'73	98	84	81	79	111	71	105
'74	102	86	77	75	104	80	98
'75	83	74	77	83	85	69	82
'76	82	66	72	64	81	86	89
'77	88	76	82	87	114	86	79
'78	81	71	83	90	121	106	87
'79	79	69	75	76	104	86	93
1880	86	73	82	86	90	115	87
'81	87	77	100	114	82	86	88
'82	80	71	91	91	81	86	91
'83	76	68	83	100	87	86	87
'84	74	65	90	85	83	86	75
'85	72	63	77	69	77	86	70
'86	74	67	84	84	82	86	98
'87	72	66	110	97	80	75	107
'88	80	66	121	115	88	71	110
'89	81	67	113	119	109	71	121
1890	75	67	105	106	105	69	108
'91	70	68	100	99	111	69	105
'92	67	65	113	118	110	63	103
'93	76	69	103	110	111	74	110
'94	72	71	104	116	106	74	113
'95	70	70	104	117	105	80	111
Total	2,325	1,913	3,254	3,394	3,465	2,037	3,368
Average	83	74	93	97	99	81	96

C—*Contd. Index Numbers (or Percentages) of Rupee Prices. The Year* 1871 = 100.

No. of Article	97	98	99	100				
Name of Commodity.	Hides and Skins.			Shellac, 1st Orange.	Total Manufactures.		Grand Total.	
	Tanned Hides, Cow.	Tanned Skins, Goat.	Tanned Skins, Sheep.		Total.	Average Index Number.	Total.	Average Index Number.
Average rupee, Price. 1871 = 100.	7,5 annas per lb.	19,7 annas per lb.	13,8 annas per lb.	Rs. 47,4 per maund.				
1861	91	92	93	100	745	93	9,175	99
'62	91	79	100	113	768	96	9,247	99
'63	93	106	99	108	794	99	9,713	104
'64	87	116	96	96	804	100	10,457	112
'65	84	108	101	66	743	93	10,868	117
'66	84	113	100	56	753	94	12,383	133
'67	84	98	99	53	727	91	11,725	126
'68	93	87	94	57	813	90	10,735	114
'69	98	90	83	59	803	89	11,844	126
1870	107	96	87	78	1,004	100	10,998	115
'71	100	100	100	100	1,100	100	10,000	100
'72	93	103	98	116	1,091	99	10,488	105
'73	93	91	80	141	1,034	94	10,672	107
'74	99	86	77	202	1,086	99	11,588	116
'75	107	95	85	193	1,033	94	10,336	103
'76	100	90	77	106	913	83	10,706	107
'77	85	85	82	68	932	85	13,848	138
'78	80	91	82	62	954	87	14,810	148
'79	98	97	103	99	979	89	13,533	135
1880	100	95	112	140	1,066	97	11,746	117
'81	101	98	97	128	1,058	96	10,638	106
'82	104	96	105	103	999	91	10,481	105
'83	107	95	105	106	1,000	91	10,644	106
'84	107	90	99	88	942	86	11,360	114
'85	99	97	103	70	883	80	11,270	113
'86	104	100	94	66	939	85	11,015	110
'87	108	105	101	65	986	90	11,133	111
'88	89	110	107	74	1,031	94	11,899	119
'89	91	115	108	125	1,120	102	12,526	125
1890	92	110	99	119	1,055	96	12,485	125
'91	91	109	103	106	1,031	94	12,765	128
'92	89	109	113	118	1,068	97	14,107	141
'93	101	126	132	148	1,160	106	13,805	138
'94	116	129	127	175	1,203	109	13,131	131
'95	120	127	123	200	1,227	111	12,803	128
Total	3,386	3,534	3,464	3,704	33,844	3,300	404,934	—
Average	97	101	99	106	1,026	93	—	—

D.—*Index Numbers of*

Name of Province.	Approximate Cultivated Area (1,000,000 Acres).	Average Rainfall in Thirty-five Years, 1861-95, = 100 inches.	1861.	1862.	1863.	1864.
1. Punjab plains	28	22·2	109	138	134	89
2. North-West Provinces and Oudh	43	39·8	108	100	93	64
3. Madras (Malabar and Carnatic) and Mysore	33	60·1	109	114	113	97
4. North, West, and Lower Bengal	65	53·8	127	94	96	80
5. Assam and Eastern Bengal		97·5	99	100	88	89
6. Central Provinces and Berar	25	43·9	123	91	87	78
7. Bombay (North Deccan, Koukan, and Ghats)	29	86·8	121	103	105	92
8. Rajputana and Central India	68	36·3	111	139	116	78
9. Hyderabad		31·5	64	95	84	91
10. Lower Burma	9*	139·6	116	122	132	114
Total	—	—	1,087	1,096	1,048	872
Average	—	—	109	110	105	87
11. Orissa Division and North Circars	—	48·6	99	131	80	80
12. Madras, Carnatic, and Mysore (included above)	—	32·5	88	103	99	88
13. Sindh, Gujrat, and Cutch	—	22·2	51	99	112	154

	1878.	1879.	1880.	1881.	1882.	1883.
1. Punjab plains	114	76	73	100	96	77
2. North-West Provinces and Oudh	86	124	67	90	84	73
3. Madras (Malabar and Carnatic) and Mysore	118	100	100	79	121	107
4. North, West, and Lower Bengal	100	102	109	107	91	86
5. Assam and Eastern Bengal	111	104	113	127	104	92
6. Central Provinces and Berar	114	94	86	106	104	127
7. Bombay (North Deccan, Koukan, and Ghats)	130	101	73	90	88	113
8. Rajputana and Central India	93	99	79	98	106	82
9. Hyderabad	133	106	98	86	100	132
10. Lower Burma	97	100	102	101	104	97
Total	1,096	1,006	900	984	998	986
Average	110	101	90	98	100	99
11. Orissa Division and North Circars	131	97	108	97	106	99
12. Madras, Carnatic, and Mysore (included above)	112	101	116	88	110	115
13. Sindh, Gujrat, and Cutch	168	91	94	125	111	95

* For all

Rainfall in India, 1861-95.

1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.
116	90	89	70	102	75	78	111	94	91	132	100	110
92	87	134	67	89	128	137	103	89	121	99	79	56
98	84	83	84	96	92	109	107	96	124	84	72	108
100	103	110	94	96	105	124	87	80	106	93	103	98
93	101	99	90	94	98	98	104	79	104	102	96	94
94	81	108	71	95	105	79	107	83	96	109	80	90
99	99	97	93	98	98	77	102	90	121	111	77	76
90	94	125	56	97	96	114	98	100	105	120	105	60
90	80	85	75	107	115	52	110	83	95	103	54	82
113	106	106	109	98	93	113	90	93	84	105	87	101
985	925	1,036	809	972	1,005	981	1,019	887	1,047	1,058	853	875
98	92	104	81	97	100	98	102	89	105	106	85	87
75	100	104	83	83	103	81	124	91	107	103	84	92
88	92	77	93	93	103	101	113	91	130	80	55	112
102	98	77	95	137	90	82	99	85	93	107	94	51

1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	Total.
98	100	109	90	85	92	107	85	113	136	134	87	3,500
105	112	106	101	115	109	114	109	95	119	149	96	3,500
94	106	96	105	107	112	88	85	113	101	97	101	3,500
79	106	116	98	98	100	110	87	89	129	104	83	3,500
82	96	112	98	104	129	110	83	108	103	104	92	3,500
126	102	98	129	88	102	101	112	116	116	111	91	3,500
100	94	110	111	106	110	116	86	121	102	102	88	3,500
117	99	90	115	90	106	93	95	120	122	114	78	3,500
106	103	131	99	81	114	109	75	160	170	112	120	3,500
93	99	93	90	103	90	89	98	88	99	103	82	3,500
1,000	1,017	1,061	1,036	977	1,064	1,037	915	1,123	1,197	1,130	918	35,000
100	102	106	104	98	106	104	91	112	120	113	92	—
91	90	135	87	83	112	107	97	105	138	100	107	3,500
106	99	115	120	98	111	96	80	98	117	98	114	3,500
128	75	103	93	83	89	81	77	126	118	147	70	3,500

Burma.

E.—*Disposal of Silver*

1	2	3	4	5	6	7
Year.	Gross Import of Silver.	Silver Bullion Received into Mints.	Decrease in Circulation of ante 1835 Coin. See Col. 2 of Appendix J.	Ante 1835 Coin. How Disposed of.		Balance Silver Bullion, Col. 2 – Col. 3, and ante 1835 Coin Melted Down, Col. 6.
				Re-coined.	Melted Down.	
	Rx.	Rx.	Rx.	Rx.	Rx.	Rx.
1835.....	1,833,673	1,410,460	2,000,000	1,520,981	479,019	902,232
'36.....	1,646,840	1,526,332	2,700,000	2,687,402	12,598	133,106
'37.....	2,215,020	2,123,069	1,300,000	1,236,676	63,324	155,275
'38.....	2,850,380	2,337,770	1,100,000	1,009,096	90,904	603,514
'39.....	1,937,022	2,325,118	1,400,000	1,004,144	395,856	7,760
1840.....	1,707,483	1,932,954	1,100,000	870,065	229,935	4,464
'41.....	1,678,086	2,108,035	2,100,000	1,596,878	503,122	73,173
'42.....	3,235,011	3,045,023	800,000	587,990	212,010	401,998
'43.....	4,743,740	4,516,599	1,000,000	972,890	27,110	254,251
'44.....	3,176,048	3,898,958	1,700,000	894,524	805,476	82,566
'45.....	1,961,357	1,820,676	1,100,100	820,467	279,533	420,214
'46.....	2,087,082	2,277,038	1,200,000	717,900	482,100	292,144
'47.....	922,185	729,422	1,000,000	765,509	234,491	427,254
'48.....	2,798,628	2,093,893	600,000	588,014	11,986	716,721
'49.....	2,235,792	2,014,906	1,000,000	471,957	528,043	748,929
1850.....	2,656,498	2,308,384	1,200,000	941,488	258,512	606,626
'51.....	3,713,280	3,725,910	1,200,000	929,518	270,482	257,852
'52.....	5,490,227	5,493,757	1,000,000	392,684	607,316	603,786
'53.....	3,770,643	3,409,946	1,000,000	646,610	353,390	714,087
'54.....	1,145,137	553,057	1,200,000	531,859	668,141	1,260,221
'55.....	8,792,793	8,291,603	800,000	343,348	456,652	957,842
'56.....	12,237,695	10,938,404	1,000,000	300,000	700,000	1,999,271
'57.....	12,985,332	11,305,863	900,000	320,000	580,000	2,259,469
'58.....	8,379,692	5,929,730	700,000	100,000	600,000	3,049,962
'59.....	12,068,926	9,358,676	2,600,000	1,660,000	940,000	3,650,250
1860.....	6,434,636	4,025,065	500,000	100,000	400,000	2,809,571
'61.....	9,761,545	8,104,169	1,000,000	200,000	800,000	2,457,376
'62.....	13,627,401	11,253,139	500,000	80,000	420,000	2,794,262
'63.....	14,037,169	9,616,236	300,000	50,000	250,000	4,670,933
'64.....	11,488,320	8,895,241	800,000	200,000	600,000	3,193,079
'65.....	20,184,407	14,367,897	400,000	20,000	380,000	6,196,510
'66.....	8,655,432	5,750,197	200,000	60,000	140,000	3,045,235
'67.....	6,999,450	4,249,241	200,000	50,000	150,000	2,900,209
'68.....	9,978,978	5,780,572	200,000	40,000	160,000	4,358,406
'69.....	8,264,408	6,640,712	200,000	70,000	130,000	1,753,696
1870.....	2,662,237	981,556	200,000	60,000	140,000	1,820,681
'71.....	8,007,525	4,173,512	200,000	20,000	180,000	4,014,013
'72.....	1,934,214	1,899,786	200,000	50,000	150,000	184,428
'73.....	4,143,726	2,669,099	100,000	20,000	80,000	1,554,627
'74.....	6,051,810	4,694,185	135,000	40,000	95,000	1,452,625
'75.....	3,464,341	2,008,945	50,000	20,000	30,000	1,485,396
'76.....	9,992,408	7,865,988	25,000	10,000	15,000	2,141,420
'77.....	15,776,532	17,239,095	90,000	...	90,000	– 1,372,563
'78.....	5,593,699	6,557,359	...	...	...	– 963,660
'79.....	9,605,001	9,471,786	...	...	...	133,215
1880.....	5,316,156	3,185,210	...	...	...	2,130,946
'81.....	6,466,389	2,213,557	...	...	...	4,252,832
'82.....	8,358,022	5,137,489	...	...	...	3,220,533
'83.....	7,408,506	3,238,623	...	...	...	4,169,883
'84.....	9,110,025	6,444,363	...	...	...	2,665,662
'85.....	12,386,260	8,969,568	...	...	...	3,416,692
'86.....	8,219,761	4,760,299	...	...	...	3,459,462
'87.....	10,589,802	10,525,379	...	...	...	64,423
'88.....	10,725,872	6,806,730	...	...	...	3,919,142
'89.....	12,388,474	8,047,537	...	...	...	4,340,937
1890.....	15,433,654	12,624,320	...	...	...	2,809,334
'91.....	10,603,733	6,238,673	...	...	...	4,365,060
'92.....	15,228,021	12,140,019	...	...	...	3,088,002
'93.....	15,314,726	4,205,236	...	...	...	11,109,490
'94.....	7,824,927	18,024	...	...	...	7,806,903
'95.....	8,338,716	...	...	...	...	8,338,716

* Includes exports and

Bullion Imports.

8	9	10	11	12	13	14	15	16
Silver Bullion, Col. 7. How disposed of.			Annual Demand for Ornaments.	Amount of Coin Melted for Ornaments, Col. 11 — Col. 9.	Amount Annually Required for Native Mints.	Amount Coined. Rupees Melted Down in Native Mints, Col. 13 — Col. 8.	Silver Exported.	Rupees Exported, Col. 15 — Col. 10.
Native Mintage.	Ornaments.	Exported.						
Rx.	Rx.	Rx.	Rx.	Rx.	Rx.	Rx.	Rx.	Rx.
200,000	702,232	...	1,300,000	597,768	200,000	...	221,777	221,777
133,106	...	...	1,300,000	1,300,000	200,000	66,894	307,958	307,958
155,275	...	...	1,300,000	1,300,000	200,000	44,725	248,076	248,076
250,000	353,514	...	1,300,000	946,486	250,000	...	205,250	205,250
7,760	...	...	1,300,000	1,300,000	250,000	242,240	286,551	286,551
4,464	...	...	1,300,000	1,300,000	250,000	245,536	305,813	305,813
73,173	...	...	1,400,000	1,400,000	250,000	176,827	394,858	394,858
250,000	151,998	...	1,400,000	1,248,002	250,000	...	282,566	282,566
254,251	...	...	1,400,000	1,400,000	350,000	95,749	1,047,699	1,047,699
82,566	...	...	1,400,000	1,400,000	350,000	267,434	1,187,486	1,187,486
350,000	70,214	...	1,400,000	1,329,786	350,000	...	1,028,867	1,028,867
292,144	...	...	1,500,000	1,500,000	350,000	57,856	708,833	708,833
350,000	77,254	...	1,500,000	1,422,746	350,000	...	1,416,376	1,416,376
450,000	266,721	...	1,500,000	1,233,279	450,000	...	2,484,724	2,484,724
450,000	298,929	...	1,500,000	1,201,071	450,000	...	962,185	962,185
450,000	156,626	...	1,600,000	1,443,374	450,000	...	539,273	539,273
257,852	...	...	1,600,000	1,600,000	450,000	192,148	847,923	847,923
450,000	153,786	...	1,700,000	1,546,214	450,000	...	885,203	885,203
500,000	214,087	...	1,700,000	1,485,913	500,000	...	1,464,899	1,464,899
500,000	760,221	...	1,700,000	939,779	500,000	...	1,115,537	1,115,537
500,000	457,842	...	1,700,000	1,242,158	500,000	...	598,418	598,418
500,000	1,499,271	...	1,800,000	300,729	500,000	...	1,164,448	1,164,448
500,000	800,000	959,469	800,000	...	500,000	...	766,384	— 193,085
600,000	800,000	1,649,962	800,000	...	600,000	...	651,350	— 998,612
600,000	900,000	2,150,250	900,000	...	600,000	...	921,363	—1,228,887
600,000	1,900,000	309,571	1,900,000	...	600,000	...	1,106,627	797,056
600,000	1,857,376	...	2,000,000	142,624	600,000	...	675,089	675,089
600,000	2,000,000	194,262	2,000,000	...	600,000	...	1,077,244	882,982
700,000	2,000,000	1,970,933	2,000,000	...	700,000	...	1,240,450	— 730,483
700,000	2,000,000	493,079	2,000,000	...	700,000	...	1,409,522	916,443
700,000	1,800,000	3,696,510	1,800,000	...	700,000	...	1,515,734	—2,180,776
700,000	1,200,000	1,145,235	1,200,000	...	700,000	...	1,692,329	547,094
700,000	2,200,000	209	2,200,000	...	700,000	...	1,405,488	1,405,279
800,000	1,800,000	1,758,406	1,800,000	...	800,000	...	1,377,956	— 380,450
800,000	953,696	...	2,200,000	1,246,304	800,000	...	946,264	946,264
800,000	1,020,681	...	2,300,000	1,279,319	800,000	...	1,720,313	1,720,313
800,000	2,400,000	814,013	2,400,000	...	800,000	...	1,487,209	673,196
184,428	...	...	2,500,000	2,500,000	800,000	615,572	1,219,070	1,219,070
900,000	654,627	...	2,600,000	1,945,373	900,000	...	1,647,902	1,647,902
900,000	552,625	...	2,700,000	2,147,375	900,000	...	1,409,608	1,409,608
900,000	585,396	...	2,800,000	2,214,604	900,000	...	1,908,986	1,908,986
900,000	1,241,420	...	2,900,000	1,658,580	900,000	...	2,793,536	2,793,536
...	—1,372,563	...	1,000,000	1,000,000	900,000	900,000	1,100,197	1,100,197
			—1,372,563	—1,372,563				
...	— 963,660	...	1,100,000	1,100,000	1,000,000	1,000,000	1,623,005	1,623,005
			— 963,660	— 963,660				
133,215	...	...	1,200,000	1,200,000	1,000,000	866,785	1,735,259	1,735,259
1,000,000	1,130,946	...	3,300,000	2,169,054	1,000,000	...	1,423,582	1,423,582
1,000,000	3,252,832	...	3,400,000	147,168	1,000,000	...	1,087,339	1,087,339
1,000,000	2,220,533	...	3,500,000	1,279,467	1,000,000	...	877,795	877,795
1,100,000	3,069,883	...	3,600,000	530,117	1,100,000	...	1,003,355	1,003,355
1,100,000	1,565,662	...	3,700,000	2,134,338	1,100,000	...	1,864,394	1,864,394
1,100,000	2,316,692	...	3,800,000	1,483,308	1,100,000	...	779,631	779,631
1,100,000	2,359,462	...	3,900,000	1,540,538	1,100,000	...	1,064,023	1,064,023
64,423	...	...	4,000,000	4,000,000	1,100,000	1,035,577	1,361,052	1,361,052
1,200,000	2,719,142	...	4,100,000	1,380,858	1,200,000	...	1,479,193	1,479,193
1,200,000	3,140,937	...	4,200,000	1,059,063	1,200,000	...	1,450,598	1,450,598
1,200,000	1,609,334	...	4,300,000	2,690,666	1,200,000	...	1,258,518	1,258,518
1,105,938	3,259,122	...	4,400,000	1,140,878	1,105,938	...	1,581,549	1,581,549
1,551,219	1,536,783	...	4,500,000	2,963,217	1,551,219	...	2,364,452	2,364,452
1,993,733	4,600,000	4,515,757*	4,600,000	...	1,993,733	...	1,594,908	1,594,908
879,316	4,700,000	2,227,587*	4,700,000	...	879,316	...	1,495,698	1,240,453
1,097,580	4,800,000	2,441,136*	4,800,000	...	1,097,580	...	1,756,494	1,158,776

decrease in hoards.

F.—*Circulation*

1 Year.	2 Approximate Circulation of Rupees, including Cash Balance in Treasuries Coined before 1835.	3 Coinage since 1835, Bullion and Old Coins before 1835.	4 Coinage to Date.	5 Issue of Paper Money without Coin Reserve.	6 Issue of Paper Money without Coin Reserve to Date.	7 Net Import of Treasure Inland.	8 Ditto to Date.	9 Total Cols. 2+4+6+8 = Gross Circulation.
	Rx.	Rx.	Rx.	Rx.	Rx.	Rx.	Rx.	Rx.
1835...	35,000,000	2,329,020	2,329,020	...	...	...	...	37,329,020
'36...	32,300,000	3,872,189	6,201,209	...	...	...	...	38,501,209
'37...	31,000,000	3,375,576	9,576,785	...	...	...	...	40,576,785
'38...	29,900,000	3,970,619	13,547,404	...	...	...	...	43,447,404
'39...	28,500,000	3,069,967	16,617,371	...	...	...	...	45,117,371
1840...	27,400,000	2,924,570	19,541,941	...	...	...	...	46,941,941
'41...	25,300,000	3,760,264	23,302,205	...	...	...	...	48,602,205
'42...	24,500,000	3,294,786	26,596,991	...	...	...	...	51,096,991
'43...	23,500,000	4,672,704	31,269,695	...	...	...	...	54,769,695
'44...	21,800,000	4,696,814	35,966,509	...	...	...	...	57,766,509
'45...	20,700,000	3,856,218	39,822,727	...	...	...	...	60,522,727
'46...	19,500,000	2,920,852	42,743,579	...	...	...	...	62,243,579
'47...	18,500,000	1,782,257	44,525,836	...	...	...	...	63,025,836
'48...	17,900,000	2,578,866	47,104,702	...	...	...	...	65,004,702
'49...	16,900,000	2,411,208	49,515,910	...	...	...	...	66,415,910
1850...	15,700,000	2,616,417	52,132,327	...	...	...	...	67,832,327
'51...	14,500,000	4,248,491	56,380,818	...	...	...	...	70,880,818
'52...	13,500,000	5,509,965	61,890,783	...	...	...	...	75,390,783
'53...	12,500,000	5,253,437	67,144,220	...	...	...	...	79,644,220
'54...	11,300,000	1,365,901	68,510,121	...	...	...	...	79,810,121
'55...	10,500,000	6,973,659	75,483,780	...	...	...	...	85,983,780
'56...	9,500,000	10,779,286	86,263,066	...	...	...	...	95,763,066
'57...	8,600,000	12,551,303	98,814,369	...	...	...	...	107,414,369
'58...	7,900,000	6,542,267	105,356,636	...	...	...	...	113,256,636
'59...	5,300,000	10,677,924	116,034,560	...	...	...	...	121,334,560
1860...	4,800,000	5,192,328	121,226,888	...	...	...	...	126,026,888
'61...	3,800,000	7,070,830	128,297,718	...	...	...	...	132,097,718
'62...	3,300,000	9,251,468	137,549,186	...	...	...	...	140,849,186
'63...	3,000,000	11,477,425	149,026,611	+ 684,886	684,886	...	...	152,711,497
'64...	2,200,000	10,358,423	159,385,034	+1,802,392	2,487,278	...	...	164,072,312
'65...	1,800,000	14,224,937	173,609,971	+1,087,239	3,574,517	...	...	178,984,488
'66...	1,600,000	5,836,754	179,446,725	+ 405,736	3,980,253	...	...	185,026,978
'67...	1,400,000	4,031,182	183,477,907	− 728,198	3,252,055	...	...	188,129,962
'68...	1,200,000	3,924,928	187,402,835	...	3,252,055	...	...	191,854,890
'69...	1,000,000	7,191,457	194,594,292	+ 660,951	3,913,006	...	...	199,507,298
1870...	800,000	1,436,094	196,030,386	− 309,655	3,603,351	...	...	200,433,737
'71...	600,000	1,408,291	197,438,677	− 376,150	3,227,201	...	...	201,265,878
'72...	400,000	3,698,824	201,137,501	+2,682,175	5,909,376	...	...	207,446,877
'73...	300,000	2,087,904	203,235,405	− 215,423	5,693,953	...	...	209,229,358
'74...	165,000	4,614,781	207,840,186	...	5,693,953	...	...	213,699,139
'75...	115,000	2,517,795	210,357,981	...	5,693,953	...	...	216,166,934
'76...	90,000	6,249,388	216,607,369	...	5,693,953	...	...	222,391,322
'77...	...	16,090,843	232,698,212	+ 304,137	5,998,090	+ 93,220	93,220	238,789,522
'78...	...	7,143,189	239,841,401	− 304,844	5,693,246	+ 94,212	187,432	245,722,079
'79...	...	10,172,035	250,013,436	+ 305,871	5,999,117	+ 219,166	406,598	256,416,151
1880...	...	4,088,691	254,102,127	− 2,042	5,997,075	+ 255,535	662,133	260,761,335
'81...	...	1,547,329	255,649,456	− 4,657	5,992,418	− 21,714	640,419	262,282,293
'82...	...	5,764,354	261,413,810	+ 7,579	5,999,997	+ 209,996	850,415	268,264,222
'83...	...	3,133,872	264,547,682	...	5,999,997	− 198,588	651,827	271,199,506
'84...	...	5,543,849	270,091,531	+ 3	6,000,000	+ 292,217	944,044	277,035,575
'85...	...	9,823,797	279,915,328	− 250	5,999,750	+ 206,454	1,150,498	287,065,576
'86...	...	4,552,896	284,468,224	− 250	5,999,500	+ 164,886	1,315,384	291,783,108
'87...	...	10,313,834	294,782,058	− 250	5,999,250	+ 413,333	1,728,717	302,510,025
'88...	...	6,800,992	301,583,050	− 247	5,999,003	+ 704,059	2,432,776	310,014,829
'89...	...	8,217,268	309,800,318	− 17,000	5,982,003	+ 49,125	2,481,901	318,264,222
1890...	...	13,051,281	322,851,599	+ 17,995	5,999,998	+ 130,006	2,611,907	331,463,504
'91...	...	5,360,014	328,211,613	+ 999,998	6,999,996	+ 134,460	2,746,367	337,957,976
'92...	...	12,509,200	340,720,813	+1,000,004	8,000,000	− 2,166	2,744,201	351,465,014
'93...	...	4,582,972	345,303,785	...	8,000,000	+ 47,217	2,791,418	356,095,203
'94...	...	43,999	345,347,784	...	8,000,000 {	+ 77,302 + 905,344‡	} 3,774,066	357,121,850
'95...	...	...	345,347,784	...	8,000,000 {	− 64,189 + 723,472‡	} 4,433,349	357,781,133

* From 1835 to 1862 the cash balance on last day of financial year; from 1863 the average on last day of each month.

of India.

10 *Average of Cash Balance at Treasuries on Last Day of each Month.	11 Coin Hoarded each Year.	12 Coin Hoarded to Date.	13 Coin Melted in Native Mints to Date, Col. 14 of Appendix E.	14 Coin Melted into Ornaments to Date, Col. 12 of Appendix E.	15 Rupees Exported to Date, Col. 16 of Appendix E.	16 Total Cols. 10, 12, 13, 14, and 15.	17 Active Circulation, Col. 9 — Col. 16.	1 Index Number on Basis of 1871.
Rx.	Rx.	Rx.	Rx.	Rx.	Rx.	Rx.	Rx.	
10,898,614	300,000	300,000	...	597,768	221,777	12,018,159	25,310,861	...
10,510,884	300,000	600,000	66,894	1,897,768	529,735	13,605,281	24,895,928	...
10,622,093	300,000	900,000	111,619	3,197,768	777,811	15,609,291	24,967,494	...
9,503,714	300,000	1,200,000	111,619	4,144,254	983,061	15,942,648	27,504,756	...
9,464,875	300,000	1,500,000	353,859	5,444,254	1,269,612	18,032,600	27,084,771	...
8,931,799	300,000	1,800,000	599,395	6,744,254	1,575,425	19,650,873	27,291,068	...
8,355,957	400,000	2,200,000	776,222	8,144,254	1,970,283	21,446,716	27,155,489	...
9,831,375	400,000	2,600,000	776,222	9,392,256	2,252,849	24,852,702	26,244,289	...
11,021,358	400,000	3,000,000	871,971	10,792,256	3,300,548	28,986,133	25,783,562	...
11,337,979	400,000	3,400,000	1,139,405	12,192,256	4,488,034	32,557,674	24,982,947	...
9,554,057	400,000	3,800,000	1,139,405	13,522,042	5,516,901	33,532,405	26,990,322	...
11,101,871	400,000	4,200,000	1,197,261	15,022,042	6,225,784	37,746,908	24,496,671	...
10,037,626	400,000	4,600,000	1,197,261	16,444,788	7,642,110	39,921,785	23,204,051	...
11,042,456	400,000	5,000,000	1,197,261	17,678,067	10,126,834	45,044,618	19,960,084	...
12,433,234	400,000	5,400,000	1,197,261	18,879,138	11,089,019	48,998,652	17,417,258	...
12,871,571	500,000	5,900,000	1,197,261	20,322,512	11,628,292	51,919,638	15,912,689	...
14,582,077	500,000	6,400,000	1,389,409	21,922,512	12,476,215	56,970,213	13,910,605	...
15,389,135	500,000	6,900,000	1,389,409	23,468,726	13,361,418	60,508,688	14,882,095	...
14,067,461	500,000	7,400,000	1,389,409	24,954,639	14,826,317	62,637,826	17,006,394	...
10,169,800	500,000	7,900,000	1,389,409	25,894,418	15,941,854	61,295,531	18,514,590	...
12,846,223	600,000	8,500,000	1,389,409	27,136,576	16,540,272	66,412,480	19,571,300	...
13,876,975	600,000	9,100,000	1,389,409	27,437,305	17,704,720	69,508,409	26,254,659	...
14,611,359	400,000	9,500,000	1,389,409	27,437,305	17,511,635	70,449,708	36,964,661	...
10,707,020	200,000	9,700,000	1,389,409	27,437,305	16,513,023	65,746,757	47,509,879	...
16,801,712	400,000	10,100,000	1,389,409	27,437,305	15,284,136	71,012,562	50,321,998	...
14,668,120	600,000	10,700,000	1,389,409	27,437,305	16,081,192	70,216,026	55,810,862	...
17,888,278	600,000	11,300,000	1,389,409	27,579,929	16,756,281	74,913,897	57,183,821	51
17,872,118	600,000	11,900,000	1,389,409	27,579,929	17,639,263	76,380,719	64,468,467	57
16,731,377	600,000	12,500,000	1,389,409	27,579,929	16,908,780	75,109,495	77,602,002	69
12,670,454	700,000	13,200,000	1,389,409	27,579,929	17,825,223	72,665,015	91,407,297	81
12,215,241	700,000	13,900,000	1,389,409	27,579,929	15,644,447	70,729,026	108,255,462	96
11,738,144	700,000	14,600,000	1,389,409	27,579,929	16,191,541	71,499,023	113,527,955	100
10,792,946	800,000	15,400,000	1,389,409	27,579,929	17,596,820	72,759,104	115,370,858	102
9,837,949	800,000	16,200,000	1,389,409	27,579,929	17,216,370	72,223,657	119,631,233	106
9,813,078	900,000	17,100,000	1,389,409	28,826,233	18,162,634	75,291,354	124,215,944	110
12,694,998	900,000	18,000,000	1,389,409	30,105,552	19,882,947	82,072,906	118,360,831	105
17,087,452	1,000,000	19,000,000	1,389,409	30,105,552	20,556,143	88,138,556	113,127,322	100
19,566,615	1,100,000	20,100,000	2,004,981	32,605,552	21,775,213	96,052,361	111,394,516	98
17,331,153	1,100,000	21,200,000	2,004,981	34,550,725	23,423,115	98,510,174	110,719,184	98
13,261,045	1,200,000	22,400,000	2,004,981	36,698,300	24,832,723	99,197,049	114,502,090	101
14,539,287	1,300,000	23,700,000	2,004,981	38,912,904	26,741,709	105,898,881	110,268,053	97
14,280,659	1,400,000	25,100,000	2,004,981	40,571,484	29,535,245	111,492,369	110,898,953	98
11,567,847	500,000	25,600,000	2,004,981	40,198,921	30,635,442	110,907,191	127,882,331	113
12,399,517	400,000	26,000,000	3,904,981	40,335,261	32,258,447	114,898,206	130,823,873	116
13,639,917	400,000	26,400,000	4,771,766	41,535,261	33,993,706	120,340,650	136,075,501	120
11,934,218	1,400,000	27,800,000	4,771,766	43,704,315	35,471,288	123,681,587	137,079,748	121
12,435,733	1,500,000	29,300,000	4,771,766	43,851,483	36,504,627	126,863,609	135,418,684	120
14,010,967	1,600,000	30,900,000	4,771,766	45,130,950	37,382,422	132,196,105	136,068,117	120
13,143,692	1,700,000	32,600,000	4,771,766	45,661,067	38,385,777	134,562,302	136,637,204	121
11,319,725	1,800,000	34,400,000	4,771,766	47,795,105	40,250,171	138,737,067	138,298,508	122
10,919,450	1,900,000	36,300,000	4,771,766	49,978,713	41,029,802	142,299,731	144,765,845	128
12,078,475	2,000,000	38,300,000	4,771,766	50,819,251	42,093,825	148,063,317	143,719,791	127
11,347,850	2,100,000	40,400,000	5,807,343	54,819,251	43,454,877	155,829,321	146,681,704	130
12,397,058	2,200,000	42,600,000	5,807,343	56,200,109	44,934,070	161,938,580	148,076,249	131
11,651,842	−1,700,000†	40,900,000	5,807,343	57,259,172	46,384,668	162,003,025	156,261,197	138
12,303,567	2,400,000	43,300,000	5,807,343	59,949,838	47,643,186	168,903,934	162,559,570	144
14,152,858	2,500,000	45,800,000	5,807,343	61,090,716	49,224,735	176,075,652	161,882,324	143
13,559,375	2,600,000	48,400,000	5,807,343	64,053,933	51,589,187	183,409,838	168,055,176	148
14,966,542	2,700,000 −2,920,849	48,179,151	5,807,343	64,053,933	53,184,095	186,191,064	166,904,139	147
21,978,192	2,800,000 −1,972,342	49,006,809	5,807,343	64,053,933	54,424,548	195,270,825	161,851,025	143
17,366,258	2,900,000 −1,843,418	50,063,391	5,807,343	64,053,933	55,583,324	192,874,249	164,906,884	146

† Four crores were received out of hoards from the Maharajah of Scindia.
‡ Import of Government Rupees by sea.

Postscript.—Some of the figures necessary for the completion of the year 1896 were not obtained in time to include in the statements and diagrams attached to this paper. They are now accordingly given as a postscript:—

Rupee Prices, 1896—*Index Numbers.*[1]

August	= 136
September	= 145
October	= 160
November	= 171
December	= 166

Index number for the whole year 1896 = 140.

Food grains rose in price very considerably during the year, whilst the average for raw products other than food grains and manufactures was lower than in the previous year, the net result of the whole showing a rise of about $9\frac{1}{3}$ per cent.

Rainfall during 1896—*Index Numbers.*

1. Punjab plains	= 60
2. North-West Provinces and Oudh	= 60
3. Madras (Malabar and Carnatic) and Mysore	= 110
4. North, West, and Lower Bengal	= 81
5. Assam and Eastern Bengal	= 80
6. Central Provinces and Berar	= 101
7. Bombay (North Deccan, Koukan, and Ghats)	= 110
8. Rajputana and Central India	= 83
9. Hyderabad	= 74
10. Lower Burma	= 99
Rainfall for all India index number	= 68

Rupee circulation for 1896—About Rx. 168,000,000.

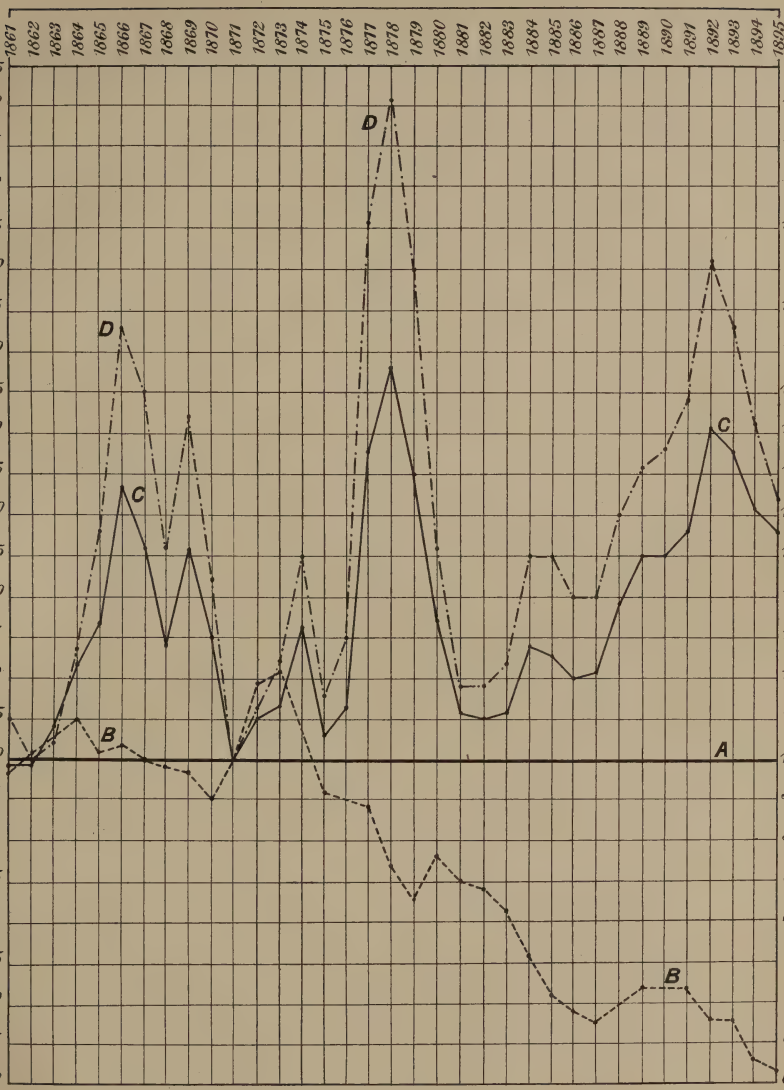
Remarks.

The fall in Rupee prices, which had been in steady progress since the end of 1892, received a check in May, 1896. Indian grain dealers apparently anticipated a short rainfall for the year, as they then commenced the purchase and storage of grain, causing the price to rise. This rise continued, though only in a comparatively modified form, throughout the rainy months of June, July, and August, during which time it was early recognised that India would be visited with scarcity, even if considerable rain fell in the later months. But even this hope was not realised, and the scarcity resolved itself into famine, and prices of food grains made a great spring upwards during August, continuing to rise

[1] See p. 111.

APPENDIX G.

RUPEE PRICES TO THE RUPEE AND GOLD PRICES TO GOLD.



A ——————— = { *Gold in relation to gold prices.* / *Rupee in relation to Rupee prices.*

B ---------- = *Gold prices.*

C ——————— = *Rupee prices—all.*

D —·—·—·—·— = *Rupee prices—food only.*

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APPENDIX H.

COURSE OF PRICES OF GOLD AND RUPEE COMMODITIES, AND OF SILVER AND THE RUPEE IN RELATION TO GOLD.

A ——————— = *Gold.*

B - - - - - - - - - - - - = *Gold prices.*

C — · — · — · — = *Silver.*

D ——————— = *Rupee prices in relation to Gold.*

E ..... = *Rupee.*

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APPENDIX J.

INDEX NUMBERS GIVING PRICES OF WHEAT IN ENGLAND AND IN INDIA.

A ——————— = *Price of Wheat in India measured in Gold.*

B - - - - - - - - - - = *Price of wheat in England.*

C —·—·—·— = *Price of Cawnpore Wheat landed in London viâ Calcutta, measured in Gold.*

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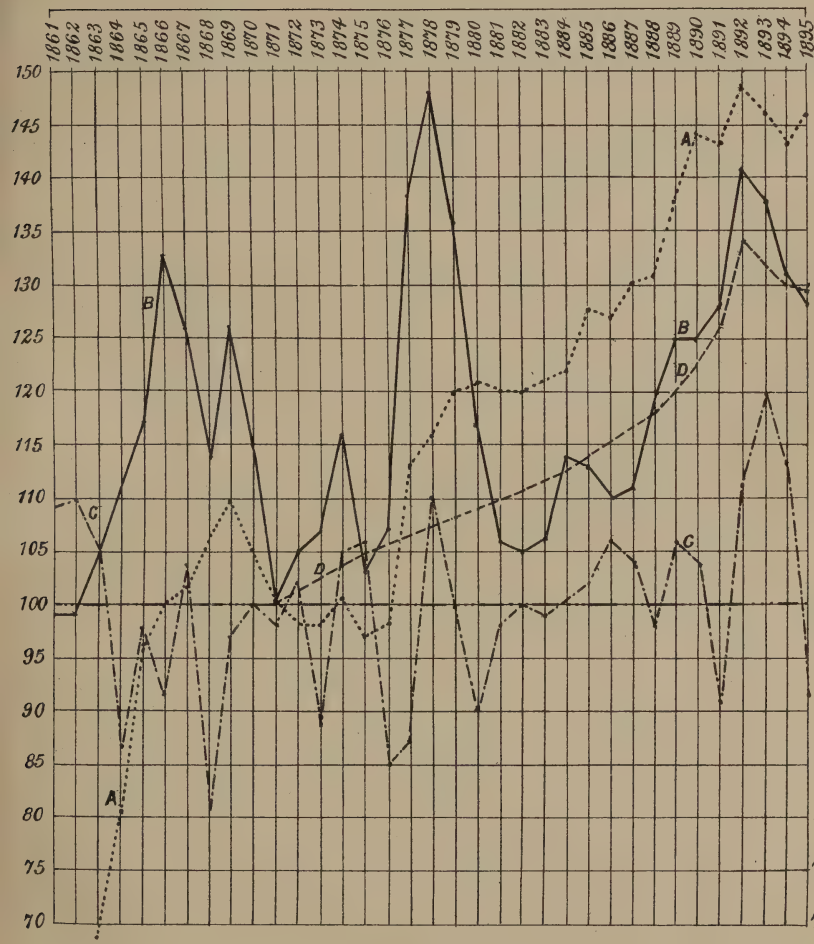
APPENDIX K.

THE COURSE OF RUPEE PRICES, THE RAINFALL, AND THE CIRCULATION.



A ..... = *Circulation.*

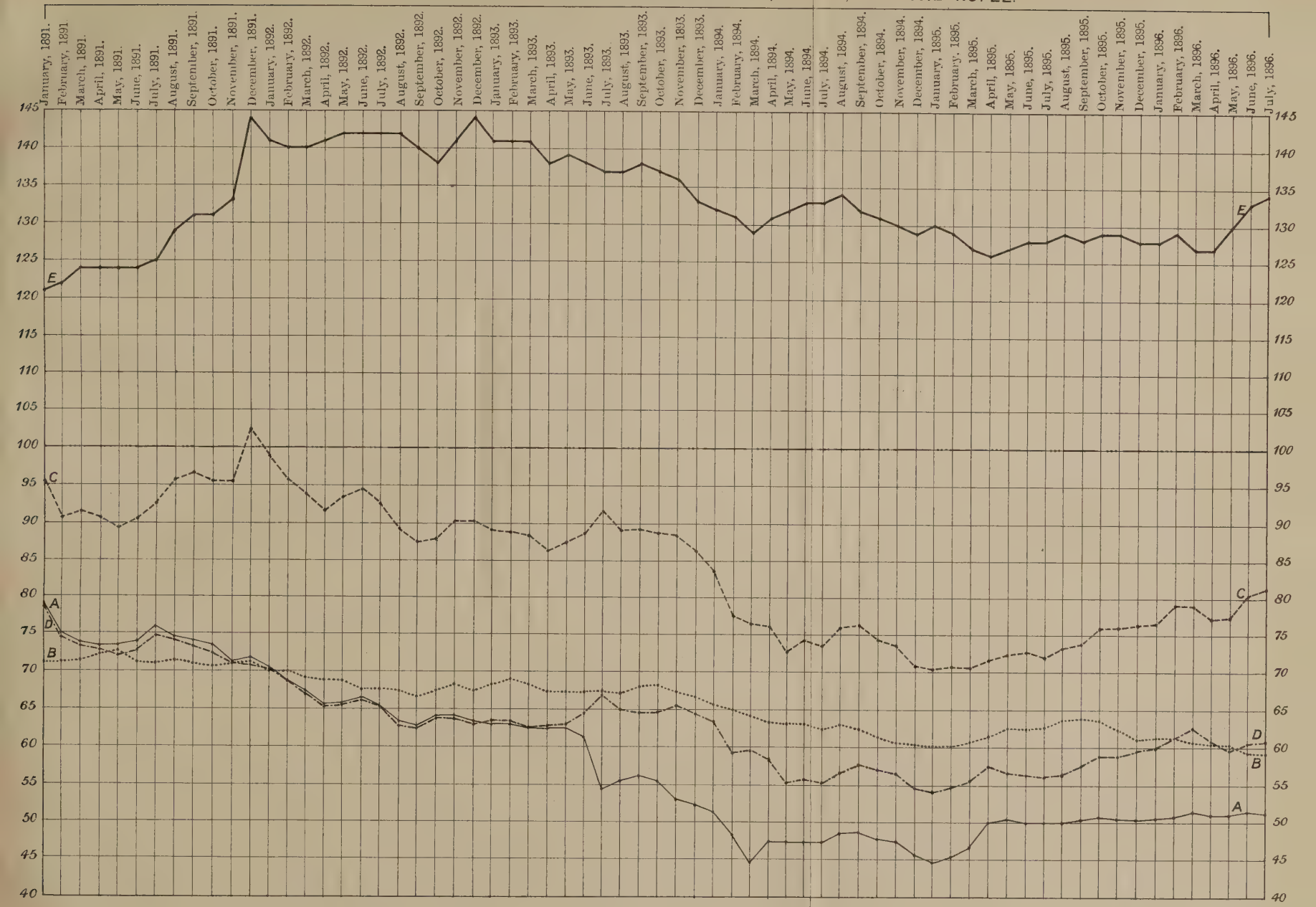
B ——— = *Silver (Rupee) prices.*

C ---·---·--- = *Rainfall of India.*

D ---------- = *Rupee prices after eliminating effects of Rainfall.*

APPENDIX L.

MONTHLY PRICES—GOLD AND SILVER COMMODITIES, SILVER, AND THE RUPEE.



A ——— *Silver* ...
B ..... *Gold prices*
C – – – – – *Silver prices*
D —·—·—·— *Rupee prices*

} *In relation to Gold.*

E ——— *Rupee prices in relation to the Rupee.*

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heavily till December, 1896, when a slight fall took place. The rise in price during the year was therefore solely due to meteorological conditions, and not to the state of the currency. The circulation, however, increased during the year, though not till towards its close, owing to the reduction of the government cash balances by about 5 crores, and to the investment of 2 crores of Rupees of the currency reserve.

The rainfall for the year (86) gives a lower index number than in any year since 1861 (the first year considered) except 1868 (81) and 1875 (85), but the deficiency from a productive point of view was actually probably greater than in either of those years, as a considerable part of the rain fell at a time when it was not required; for example, the Central Provinces received a rainfall above the normal, and yet the famine in that province is reported to be worse, especially in the Jubbulpore division, than in any other part of India, except in certain tracts of the North-West Provinces and Oudh.

During the latter and most important months of the year the currency experiment did not receive fair play. Famine and plague combined disorganised trade, the demand for Council Bills fell away, and the full amount offered for sale week after week was not taken up, and all competition disappeared. The result was that though the Rupee continued its upward rise in its gold value, the final point of 16*d.* to the Rupee was not reached, as might otherwise have been the case.

F. J. A.

Calcutta,
3rd March, 1897.

A Measure *of* Civilisation. *By* Marcus Rubin, *Director of the Royal Danish State Bureau of Statistics.* Translated by A. W. Flux, M.A.

At the Swedish Economic Congress a year since, Hr. Gustav Sundbärg, actuary to the Swedish Royal Statistical Central Bureau, proposed the figures of the mortality returns as measures of relative civilisation.[1] Hr. Sundbärg, in the first place, takes for granted that, for an estimate of mortality, the general death-rate—the proportion of the deaths per annum to the population—is at once the most accurate expression and the one most applicable to comparisons. In proof of this, he refers to a treatise on Demography which he has published, and therefore does not enter on the technical side of the matter here.[2] I shall, in this, follow his example, especially as I have also dealt with this subject previously.[3] I entirely agree with Hr. Sundbärg, that the theoretical objections to employing the general death-rates for comparative measures do not hold good; in any case the complicated expressions of mortality which have been proposed are not very commendable, and, although adopted by the International Statistical Institute, the opposition they have encountered, amongst others, by the unanimous opinion of the statisticians of the German municipalities, is surely sufficient to prevent the maintenance of their already weak position.

In the course of his clever address, Hr. Sundbärg expresses himself as follows:—"Every rational human activity has, as its innermost purpose, the struggle *for* life, *against* disorganisation and death. But it is just these rational activities of mankind which we comprehend in the term *civilisation*. Thus the figures of mortality must, in truth, be also a measure of how far civilisation has been able to repel the forces of death. It is not implied by this, that the mortality returns may be employed, for this purpose, in a purely mechanical fashion, so that, with the mere figures, one might be able, without more ado, to read off by how much per cent. one country's civilisation stood higher than that of another. If we would ascertain the meaning of the figures of mortality, it is necessary, not only to study these on their own account for the

[1] G. Sundbärg, Dødstalen saasom Kulturmätare. ("Nationalökonomiska "Föreningens Förhandlingar," i Aaret, 1895, Stockholm, 1896.)

[2] G. Sundbärg, "Befolkningsläran," a volume which appeared in 1894, and which is one part of the larger work "Det Ekonomiska Samhällslifvet."

[3] See "Jahrbücher für Nationalökonomie und Statistik," dritte Folge, 6 B.

different places and times, but also the whole circumstances, so far as we can procure information about them. It is, however, my conviction that the result of this will, in the end, be that the mortality returns will prove an excellent *guiding thread* to a comprehensive estimate; in truth, the best which can be found."

Hr. Sundbärg then tries to substantiate this view by figures, verbal argument, and graphic representations. He compares the figures of mortality for different countries and different times with our knowledge, from other sources, of the civilisation of these countries and times, and shows the agreement of the scale given by death-rates with the general view of the gradations in the civilisation of these places and times; where there is a lack of agreement, he points to illustrations to show that this general view estimates falsely the standard of civilisation, and that, in reality, this agrees with what the figures of mortality indicate. In this way he takes up the position that civilisation is not to be measured by the *élite* of a nation, but by the power with which it has penetrated all classes of the community. This once grasped, we shall find that the figures of mortality are well adapted to form an estimate of the standard of civilisation reached, and to serve as a guide to their progress or decay.

However, I do not quite agree with Hr. Sundbärg in his fundamental view, and it is to this disagreement and the emendation I wish to propose, that this article will be devoted.

Let us even suppose it were perfectly true that the greatness or smallness of the figures of mortality is an evidence of the strength with which, by the conscious and unconscious co-operation of community and individual, we contrive to keep back death, it is, after all, but a *maintaining*, not a *creating* strength. But, no more than the human race itself, can civilisation continue without renewal. The two most active instincts in all living things are those of self-preservation and reproduction, both alike necessary for the conservation of life and of the human race. Smallness of the figures of mortality is an expression of the triumph of self-preservation, but this must not be purchased at the cost of the increase of the race, which finds its expression in the *figures of natality*. The way in which the human race regulates the figures of natality is the reverse of the medal, and it cannot be omitted in a complete estimate of "civilisation."

France, in the decade 1881-90, had a death-rate of 22·0 per thousand, England had a death-rate of 19·1 per thousand in the same period, but this difference is not sufficient to indicate the difference in civilisation. Now, in this same decade, France had a birth-rate of 23·9 per thousand, while England's birth-rate was 32·5. Apart from the question of how far, regarded from the

point of view of vital statistics, the higher birth-rate might not have warranted a higher death-rate, there is, on the side of England, a further supremacy in civilisation, in that she provides for the increase of the race, and that in a civilised fashion, namely, by sustaining her offspring as well as giving them birth.

In Rubin and Westergaard's "Marriage Statistics" distinctions are drawn between five classes in society, of which the third, fifth, and first are the most noteworthy. The third class is "employees" at small salaries, a prudent class, bringing but few children into the world, but with a comparatively low death-rate, a class which is struggling to maintain its position; the fifth class is "the working class," which is prolific, but with a high death-rate; an imprudent class, which lets things take their own course because it has little to lose; lastly, the first class are the well-to-do, among whom the faculty of prudence and the means to suffer things to take their own course, taken together, set their stamp on their productivity. One might, with the figures of births and deaths before one, imagine three countries, peopled respectively by the first, third, and fifth classes. "The country of the first "class would then be—in comparison with the others—the ideal "country. By instituting a comparison between the three coun-"tries, the observer would arrive at the following result: that in "the country of the fifth class the fertility and the population "were great, but that the population was continually—in Malthus' "expression—driven back from 'Nature's table'; that in the "country of the third class the fertility and the population were "small, but that those who were found in that country had a "considerably easier existence than in the country of the fifth "class; and, finally, in the country of the first class, both that "those who lived there could put forth new shoots, and that "these new shoots in turn were able to live." [4]

But these three classes, and these three imaginary countries, are also three grades of civilisation. The lowest stage of civilisation is to go forward blindly, which in this connection means to bring into the world a great number of children, who must, in great proportion, sink into the grave. Such was the characteristic feature of the past, it still remains so for the nations of the East, and a numerical example of it in Europe was to be found in the figures of births and deaths of Galicia so recently as 1841-50, when these were respectively 42·1 and 40·2 per thousand of the population per annum. The next stage of civilisation is to see the danger and to keep clear of it. This is the case with France.

[4] Rubin og Westergaard, "Egteskabsstatistik." Kbhvn, 1890, p. 113. ("Ehestatistik." Jena, 1890.)

Lastly, the highest stage of civilisation is to see the danger and overcome it, which in this case means to realise that strong vitality itself brings death with it, but then to triumph over the situation, not to weaken the vital force, but to render possible its development, to commemorate the power of the Renaissance—and the civilisation of the Renaissance cannot be separated from its vigorous life—but at the same time to cut a channel in which that power can be exerted in regulated courses. For in this relation too there is appropriateness in Young's words—as

> "Are passions then the Pagans of the soul,
> Reason alone baptized?"

Civilisation is the baptism of the passions. In the cloister neither does the mother die of fever nor the child of croup; but, outside the cloister, to find both mothers and children, and bring both well through fever and through croup,—that is civilisation.

The statistical expression for this, then, seems to be: the highest birth-rate in conjunction with the lowest death-rate. In a single figure, however, it can only be expressed as a quotient of the death-rate and birth-rate. (That it cannot be expressed by the difference is evident from the consideration that this difference may be one and the same in spite of a great difference in the proportion between death-rate and birth-rate; 4 is the difference of 20 and 24, 40 and 44, &c.) The difference between the civilisation of England and that of France should, then, not be stated as the proportion between 19·1 and 22·0, but as the proportion between $\frac{19{\cdot}1}{32{\cdot}5}$ and $\frac{22{\cdot}0}{23{\cdot}9}$, *i.e.*, $\frac{0{\cdot}59}{0{\cdot}92}$. Dividing numerator and denominator of the last fraction by 3 we obtain $\frac{0{\cdot}197}{0{\cdot}307}$; thus the "relative civilisation" of England compared with France will be expressed more justly by $\frac{19}{30}$ than by $\frac{19}{22}$.

This, however, is not yet satisfactory. We should bear in mind that we have taken the thoughtless increase of children combined with the highest death-rate as the lowest standard, and, as a higher standard in comparison, the restrictive procedure, in which, in order to produce a low death-rate and little suffering, one also puts up with low vitality. If we have two countries or two districts in which $\frac{d}{b}$ (death-rate divided by birth-rate) becomes respectively $\frac{20}{20}$ and $\frac{50}{50}$, then both alike = 1, and the civilisation should be identical. But that would be misleading. The birth-

rate must only be used as a corrective in connection with the death-rate where the question is that of the standard of civilisation. In relations otherwise similar, the death-rate affords an extremely serviceable measure for the standard of civilisation, and, of course, that cannot be equally stated for the birth-rate, since the force which reduces the death-rate is a civilising force, that which augments the birth-rate is instinctive. *Where, therefore, the death-rates and birth-rates are in the same proportion to each other, the death-rate becomes the measure.* If, in two countries the death-rates and birth-rates are to each other in the proportions $\frac{20}{20}$ and $\frac{50}{50}$, these two countries are not on the same level, but in the proportion of 20 to 50. For if with a birth-rate of 50 we do not advance further than with a birth-rate of 20, we have simply augmented the sum of human suffering from 20 to 50, and this augmentation of suffering obtains its correct expression in the difference in the civilisation between 20 and 50. And what holds good for the proportions $\frac{20}{20}$ and $\frac{50}{50}$, holds good also if the proportions be, for example, $\frac{18}{24}$ and $\frac{27}{36}$, since, in this last case, we have in both countries three deaths for four births, and in such a case, the fraction $\frac{18}{24}$ betokens the more fortunate condition, since the increase in the birth-rate from 24 to 36 has gone hand-in-hand with an increase of death and suffering from 18 to 27, and nothing is gained. Here again the correct measure of civilisation is to be sought in the difference between the figures of deaths. The fact that $\frac{27}{36}$ produces a greater absolute increase in population than $\frac{18}{24}$ does not affect the present question, as it cannot be decided in the abstract when or where a greater population is, from the point of view of civilisation, to be preferred to a smaller. What it is here important to obtain an estimate of is only this, that an offset to the augmentation in the sufferings of the community which results from 27 deaths in place of 18 to every thousand persons, first begins at the point at which the birth-rate is increased beyond this proportion. It is not just to consider the death-rates 18 and 27 without reference to the concurrent vital force in the respective communities, but, on the other hand, it would lead to improbable results were we to allow the birth-rates to operate in a favourable direction, to the diminution of the differences of death-rates so long as the proportion between death- and birth-rate is identical, that is, so long as the vital energy has

not had potency sufficient to get the upper hand of the increased death-rate.

But there is this further result, that where the increased birth-rate has not even kept pace with the increased death-rate, there the mortality returns do not give sufficient expression to the differences between places and times. It is clear enough that if, and when, we take into consideration the number of births, then an absolutely diminished birth-rate, under conditions otherwise alike, will operate unfavourably, and the effect of the lower birth-rate will be accentuated when it appears in conjunction with the higher death-rate. In the case of the higher death-rate of France than that of England, accompanied by its lower birth-rate, we found an increase of the difference from that of 19 and 22 (death-rates only) to that of 19 and 30 (death- and birth-rates combined). But supposing France to have had a higher birth-rate than England, in that case the difference would still have been increased, though naturally in a less degree. The limit at which the difference is measured by the mortality figures alone is, in fact, not at that point at which the birth-rates are absolutely identical, but that at which they are relatively identical, *i.e.*, stand in the same proportion to the death-rates. That epoch, if the death-rate be growing, is not only so much more unfortunately situated than the preceding as the difference of death-rates indicates, but by so much the more if the concomitant birth-rate has not grown in a corresponding degree, when—with the same example as before—we have not only a death-rate of 18 per thousand growing to one of 27 per thousand, but there are not even as previously, 4 births for every 3 deaths. Briefly, where we have $\frac{18}{24}$ and $\frac{27}{36}$ we have the difference determined in accordance with the contrast between 18 and 27, where we have $\frac{18}{24}$ and $\frac{27}{35}$ this difference augments; not until we have $\frac{18}{24}$ and $\frac{27}{37}$, that is to say, where the death-rate has grown from 18 to 27, it is true, but where the birth-rate has produced a more favourable proportion between deaths and births than before, do we find evidence of that increased vitality not followed by increase in the same degree of mortality, a modifying influence on the difference of death-rates; there the inclusion of the figures of births, representing the creating vital energy, must have the right to operate in a positive direction.

We will now seek a shorter expression for the following, that where the proportions between death- and birth-rates are the same for two countries, the difference between those countries is

measured by the difference between their death-rates, and that the difference increases or diminishes according as the aforesaid proportion varies.

Let A and B be two countries, d_1, d_2, and b_1, b_2 their respective death- and birth-rates. The first hypothesis which was advanced was that the civilisation of the countries should be estimated in the proportion of their death-rates; this gives $\frac{A}{B} = \frac{d_1}{d_2}$ (1). As this took no account of the birth-rates, we introduced these, in order to diminish the sole influence of the death-rate on the measure of civilisation, and divided by the birth-rate; the measure of civilisation became the quotient of these two. The equation (1) was thus changed by the introduction of the factor $\frac{1}{b_1}$ in the numerator and the factor $\frac{1}{b_2}$ in the denominator. Thus we obtain $\frac{A}{B} = \frac{\frac{d_1}{b_1}}{\frac{d_2}{b_2}}$ (2). As however the birth-rate here obtained too great an influence, we reverted, in the case when it was equal to the death-rate, to $\frac{A}{B} = \frac{d_1}{d_2}$, with the condition $\frac{d_1}{b_1} = \frac{d_2}{b_2}$, while the birth-rate did not make its influence felt till the last named fractions became unequal. The mode by which we express this most simply is by again altering equation (2), by introducing d_1 as a factor in the numerator and d_2 in the denominator, in order to diminish the influence of the introduction of $\frac{1}{b_1}$ and $\frac{1}{b_2}$ as factors. We thus obtain $\frac{A}{B} = \frac{\frac{d_1^2}{b_1}}{\frac{d_2^2}{b_2}}$ (3). This expression satisfies those conditions which must be taken into consideration. For when in (3) $\frac{d_1}{b_1} = \frac{d_2}{b_2}$, we have $\frac{A}{B} = \frac{d_1}{d_2}$, and according as $\frac{d_1}{b_1} >$ or $< \frac{d_2}{b_2}$ we get $\frac{A}{B} >$ or $< \frac{d_1}{d_2}$. We thus arrive at the position that the countries are to be measured in relation to each other by the proportion between *the square of the death-rate divided by the birth-rate* of each. The measure will not be d, and not $\frac{d}{b}$ but $\frac{d^2}{b}$.

Before proceeding further we will employ the above-mentioned

result in the following concrete case. In the decade 1881-90 the death-rates and birth-rates were :—[5]

	Per Annum per Thousand Persons.	
	Death-Rate.	Birth-Rate.
1. France	22·0	23·9
2. Germany	25·1	36·6
3. Galicia	32·8	44·2

If we take the death-rate (d) alone as the measure, the order of "civilisation" would thus be that given above. If, on the other hand, we take as our point of departure the death-rate divided by the birth-rate $\left(\frac{d}{b}\right)$, we get

1. Germany	0·69
2. Galicia	0·74
3. France	0·92

That, in this way, we overshoot the mark, appears at once from the order here stated. But if, finally, we turn to the square of the death-rate divided by the birth-rate $\left(\frac{d^2}{b}\right)$ as measure, we get—

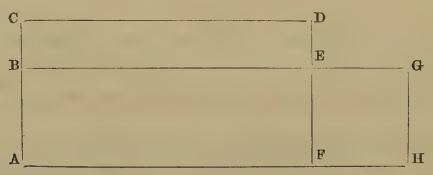
1. Germany	17·2
2. France	20·3
3. Galicia	24·3

By employing $\frac{d^2}{b}$ in place of d alone the difference in "civilisation" between Galicia and Germany increases from $\frac{32·8}{25·1}$ to $\frac{24·3}{17·2}$ *i.e.*, from 1·3 to 1·4—and rightly so, for though it is true that the birth-rate is higher in Galicia than in Germany, it does not keep pace with the higher death-rate. When, on the other hand, we employ $\frac{d^2}{b}$ in place of d for France and Galicia, the difference in civilisation is reduced from $\frac{32·8}{22·0}$ to $\frac{24·3}{20·3}$ *i.e.*, from 1·5 to 1·2; and rightly so, since Galicia has a much higher death-rate than France, but has, at the same time, a still greater excess in its birth-

[5] The figures here quoted, and most of those which follow, are based on the data given in Sundbärg's "Befolkningsläran."

rate. Finally, in regard to the proportion between Germany and France, Germany stands, using d as measure, $\frac{1}{7}$ below France, while $\frac{d^2}{b}$ places France $\frac{1}{6}$ below Germany—and rightly so, for it is quite true that Germany has a death-rate higher by $\frac{1}{7}$ than that of France, but it has a birth-rate higher by about $\frac{4}{7}$, hence the "civilisation" is also on its side, if we understand by civilisation neither frivolity nor cowardice (lack of refinement[6] or excess of refinement,[6] both anti-refinement[6]) but restrained energy. Compared with a country which, with a birth-rate of only 24, has a death-rate of 22, it is a mark of a higher civilisation permeating the community when, with a birth-rate of 37 we find a death-rate of only 25. "Every rational human activity has, as its innermost "purpose, the struggle *for* life *against* disorganisation and death." This is true. But the outcome of the strife between the individual's life and death is certain enough—it is death. The whole community, on the contrary, holds its own against death through a corresponding renewal of life, and it triumphs over death by a renewed life so strenuous, and a conservation of life so rational, that the power of death is diminished in the new and more numerous generation.

The $\frac{d^2}{b}$ of a place or time can be represented by a rectangular area of which $\frac{d}{b}$ is the height, d the base line, as shown in the annexed figure.



Let A C D F, A B E F, and A B G H represent three countries having percentage death-rates 1·5 (d_1), 1·5 (d_2), 2·0 (d_3), respectively, and percentage birth-rates 2·0 (b_1), 3·0 (b_2), 4·0 (b_3), respectively. The height of the rectangles is the death-rate divided by the birth-rate, the base line is the death-rate, and the three areas are :—

$$\frac{d_1^2}{b_1} = 1{\cdot}125, \quad \frac{d_2^2}{b_2} = 0{\cdot}750, \quad \frac{d_3^2}{b_3} = 1{\cdot}000.$$

[6] Translator's note. The word here is "kultur," which is rendered throughout the article by "civilisation."

The first two rectangles have the same base-line ($d_1 = d_2 = 1{\cdot}5$), and their areas are in inverse proportion to the birth-rates; the last two rectangles have the same height $\left(\frac{d_2}{b} = \frac{d_3}{b_3} = \frac{1}{2}\right)$ and their areas are in simple proportion to the death-rates; the first and the third rectangles have neither height nor base the same, d_3 is one-third greater than d_1, but, as b_3 is at the same time double as great as b_1, $\frac{d_1^2}{b}$ is one-eighth greater than $\frac{d_3^2}{b_3}$.

If we take $\frac{d^2}{b}$ as the measure of civilisation, so that the greater $\frac{d^2}{b}$ becomes the lower is the civilisation, and represent each country by a rectangle whose height is the death-rate divided by the birth-rate, and whose base line is the death-rate, the "civilisation" of the countries will be in inverse proportion to the size of these rectangles.

If we arrange the countries of Europe, on the one hand in accordance with d, and on the other in accordance with $\frac{d^2}{b}$, we obtain the following result:—

Per Annum per Thousand of the Population, 1881-90.

Order in Accordance with d.	Death-Rate (d).	Birth-Rate (b).	Order in Accordance with $\frac{d^2}{b}$.	$\frac{d^2}{b}$.
1. Sweden	16·9	29·1	1. Norway	9·4
2. Norway	17·0	30·8	2. Sweden	9·8
3. Denmark	18·6	31·9	3. Denmark	10·8
4. England	19·1	32·5	4. England	11·2
5. Scotland	19·2	32·3	5. Scotland	11·4
6. Belgium	20·3	30·4	6. Finland	12·8
7. Switzerland	20·8	28·1	7. Holland	12·9
8. Holland	21·0	34·3	8. Belgium	13·6
9. Finland	21·2	35·0	9. Switzerland	15·4
10. France	22·0	23·9	10. Germany	17·2
11. Germany	25·1	36·6	11. Italy	19·8
12. Italy	27·4	37·9	12. France	20·3
13. Austria	28·1	35·2	13. Austria	22·4
14. Hungary	32·3	43·8	14. Hungary	23·8
15. Galicia	32·8	44·2	15. Galicia	24·3
16. Russia	35·0	48·5	16. Russia	25·3

By taking $\frac{d^2}{b}$ instead of d as our basis, we increase the disparity between the figures of the Scandinavian Peninsula and those of Russia from that of 16·9 and 35·0 to that of 9·4 and 25·3, that is to say, by about two-thirds. Were this disparity not

to have increased, Russia's birth-rate, assuming a death-rate of 35 per thousand, must have reached the improbable height of fully 60 per thousand, and in order that $\frac{d^2}{b}$ might give the same quotient for Russia as for Scandinavia, its birth-rate would require to reach the impossible height of fully 120 per thousand. But were the death-rate of the Czar's empire, with its birth-rate of 48·5, not greater than the 21·2 of his Grand Duchy, that is to say, were the fertility of the Orient united with an Occidental organisation, a jungle and a garden linked in a higher unity, then $\frac{d^2}{b}$ would be but 9·3, and Russia would rightly take the foremost place among the nations.

For the rest, the use of $\frac{d^2}{b}$ in place of d as the measure results in Finland being placed above Belgium and Switzerland; France, on the contrary, has come below Germany and Italy, and, finally, Sweden has been compelled to yield its supremacy to Norway. Thus, of the sixteen States, the greater part, nine, have changed their places, while seven occupy the same places as before.

Naturally, as we can compare country with country, so also can we compare age with age, urban with rural populations, &c. For an urban population, too, it may be a mark of inferior "civilisation" when, so to speak, it cannot digest its more numerous births, but allows its death-rate to grow in proportion to the birth-rate; and, in any case, a not unimportant addition to the death-rate in towns arises from the class of illegitimate children, homeless persons, and many others, who, willingly or unwillingly, occupy a place below the general level of civilisation, and induce a lowering of this level in the very "centres of civilisation" themselves, where, chiefly, they seek to obtain a living.

The use of $\frac{d^2}{b}$ further gives to b an important influence only where it makes its appearance with special power. Further, the influence of d is extended by the squaring. A precisely formulated measure of how great the difference in birth-rate should be, in order that it may, in spite of the squaring of d, alter an unfavourable to a favourable relation cannot be given; but a wide range of cases will fall under the following rule:—When $d > d_1$, nevertheless $\frac{d^2}{b} < \frac{d_1^2}{b_1}$ when b_1 is double as many—or more—per cent. less than b, as d_1 is less than d. For example, with $d = 20$, $d_1 = 18$, and $b_1 = 32$, $\frac{d^2}{b} < \frac{d_1^2}{b_1}$ when $b = 40$, since 18 is 10 per cent. less than 20, but at the same time 32 is 20 per cent. less than

40, and the quotients will be $10{\cdot}0 < 10{\cdot}1$. Thus, when d_1 is one-tenth, one-fifth, one-third, &c., less than d, but b_1 is, at the same time, double as much less than b, then $\frac{d^2}{b} < \frac{d_1^2}{b_1}$. If a country, a time, &c., have a death-rate of 21 and a birth-rate of 27, nevertheless that country, that time, &c., which has a death-rate of 24 with a birth-rate of 36, will be more favourably situated, since the difference between the death-rates is 1 in 8, but between the birth-rates 2 in 8. A similar relation would, of course, have held had the last mentioned birth-rate been greater than 36; but it was even the case already when this birth-rate was 35·3. The rule mentioned is, therefore, correct and generally applicable, so far as it goes, but, as stated, it does not probe the matter to the very bottom. Any further discussion of it would, however, not provide sufficient interest.

An example of more definitely marked progress from one time to another, shown by the use of $\frac{d^2}{b}$ instead of d alone, where d is decreasing and b increasing at the same time, is given by various European States during the last forty years. We have, namely, the following:—

	1841-50.			1881-90.		
	d.	b.	$\frac{d^2}{b}$.	d.	b.	$\frac{d^2}{b}$.
Norway	18·2	30·7	10·8	17·0	30·8	9·4
Denmark	20·5	30·5	13·8	18·6	31·9	10·8
Holland	26·2	33·0	20·8	21·0	34·3	12·9
Germany	26·8	36·1	19·9	25·1	36·6	17·2

Thus the use of $\frac{d^2}{b}$ is especially favourable to Holland, where the advance becomes well over a third instead of barely a fifth.

An example of an unfavourable tendency both of d and of b, and therefore an accentuation of the retrograde movement by the use of $\frac{d^2}{b}$, is found in the case of Denmark for the decade 1881-90; for in the quinquennium 1881-85, d was 18·5, b being 32·5, but in the quinquennium 1886-90 d was 18·8, while b was 31·5, and the increased death-rate together with the decreased birth-rate finds expression in the increase of $\frac{d}{b}$ from 10·5 to 11·2.

I shall, in conclusion, give two examples of the case in which a forward movement, *i.e.*, a diminution so far as death-rate is

concerned, is converted into a backward movement by the use of $\frac{d^2}{b}$ on account of the comparatively sharp decrease in the birth-rate. In 1881-85 England showed $d = 19{\cdot}4$, $b = 33{\cdot}5$; in 1886-90 these were respectively 18·9 and 31·4: thus the death-rate had, indeed, decreased, but, by the use of $\frac{d^2}{b}$ we still get an increase of the index, namely, from 11·2 to 11·4.

Finally, in the first half of the last decade 1880-84, the death-rate in Copenhagen was 23·5, the birth-rate 38·2; in the first half of the current decade 1890-94, the death-rate was 22·2, the birth-rate 32·9. In spite of the diminution in the death-rate from 23·5 to 22·2, we thus get, by the use of $\frac{d^2}{b}$, on account of the heavy decrease in the birth-rate, an increase of the index from 14·5 to 15·0, *i.e.*, a corresponding declension.

Should the death-rate be accepted as a measure of "civilisation," or as an indication of standard of civilisation—and there appears to be much that may be said for accepting this as an excellent assistance towards a judgment of civilisation—it seems to me quite wrong to ignore the birth-rate, which is not only an important factor in the death-rate, but is the very complement of that rate. The object of this article has been to introduce b into the estimate, in that place and with that force of which I have tried to show the justice, and by which the measure is changed from d to $\frac{d^2}{b}$. But it must be borne in mind than it has never been intended to measure by units or decimals in accordance with d, or, by help of d to think of excluding from consideration the manifold other conditions which determine the "civilisation," or which, on the side of nature, can influence the magnitude of d; no more is this intended with $\frac{d^2}{b}$. The calculations and results given above must not be interpreted literally, or rather numerically. With this reservation, I hold, on the other hand, that the use of $\frac{d^2}{b}$ will be a serviceable guide to a consideration of the conditions of very important departments of the life and civilisation of the people.

NOTE.—The first number for 1897 of the "Nationaløkonomisk "Tidsskrift" contains a criticism by Hr. Sundbärg of the above article. It deals in part with the difficulty of determining the precise influence which should be assigned to b if it be admitted

as a component factor in the index of civilisation. It is maintained that $\frac{d}{\sqrt{b}}$ is a preferable index to $\frac{d^2}{b}$, and further that in place of b should be written $\frac{b}{35}$, 35 being the average value of b for Western Europe. It is urged that (the case of France being put aside as needing exceptional treatment) the advantage gained by the introduction of b into the index is problematical, and on this ground the use of the death-rate, pure and simple, as an index is claimed as most satisfactory.

Hr. Rubin replies by a forcible re-statement of his position. He urges that if the modification proposed by Hr. Sundbärg be adopted, in place of 35 there should be used the average value of b for the particular cases entering into any comparison which may be in question. What is desired, however, is to place the different cases compared in proper order, and the index is not intended to be a precise numerical measure of the degree of civilisation. No improvement in this respect justifies the modification proposed. Finally, the civilisation of a country cannot be adequately judged without considering, not merely its death-rate, but the proportion in which the birth-rate stands to the death-rate.

The discussion is closed by a few further remarks from Hr. Sundbärg, mainly on questions of local detail, which I have refrained from introducing into this summary of the chief points raised.—A. W. F.

MISCELLANEA.

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I.—*Report of a Committee with reference to the proposed Universal Synchronous Census in* 1900.

The Committee appointed by the Council of the Royal Statistical Society, having considered M. Guillaume's circular[1] in reference to a Universal Synchronous Census in 1900, unanimously report as follows:—

"1. The grave disadvantages to each individual country that would inevitably result from breaking the regular series of decennial censuses would more than outweigh any advantages that might accrue from a Synchronous Census of the whole world.

"2. As regards the British Empire, climatic conditions render a Synchronous Census impracticable.

"3. As regards uniformity of schedule and of tabulation of results, the Committee desire to call especial attention to the fact that, inasmuch as the data are obtained in different countries by widely different methods, the data of one country may differ in value from those of another to such an extent as not to be strictly comparable, except, perhaps, so far as the most obvious facts are concerned.

"4. The following suggestions of the Committee are based on the assumption that, in this country, the schedules will in the future, as in the past, be filled up by the householders or occupiers themselves.

"5. As regards *occupations*, it is, in the first place, necessary that the object in view should be clearly laid down. A Census may aim at determining:—

(i.) The number of persons actually working at each trade, or following each occupation;

[1] See p. 635, part iv, vol. lviii of the *Journal* for 1895.

or,

(ii.) The number of persons dependent upon each trade or occupation;

or,

(iii.) Both these sets of facts combined.

Until this fundamental point has been decided, it would appear to be waste of time to attempt to settle the questions to be asked in the schedule, or to discuss the difficult questions involved in the classification of occupations.

"6. As regards *nationality*, the Committee consider that it is not desirable to go beyond the birthplace, since that appears to be the only term that is free from ambiguity.

"7. As regards *dwellings*, the definition of the term 'house' increases in difficulty; but the term 'tenement' or 'holding' (signifying separate occupation) seems comparatively free from ambiguity. The 'tenement' may, in fact, be a single room, several rooms, or an entire house, according to the amount of dwelling space occupied by the family.

"8. Under any system, large institutions, such as asylums, barracks, hospitals, hotels, schools, &c., demand special and separate treatment.

"9. The Committee consider that the following five facts are all that should be insisted on for uniform treatment in all countries:—

(i.) The number of the resident or *de facto* population.

(ii.) Sex.

(iii.) Age. The first five years separately, the rest in quinquennial periods; distinguishing the sexes.

(iv.) Civil condition—as single, married, widowed, combined with sex and age. As any return of the divorced is likely to be very incomplete, any persons describing themselves as 'divorced' should be included under 'widowed."

(v.) Birthplace. Natives by such administrative, or other sub-divisions, as may be convenient in each country. Foreigners by country of birth, combined with sex and age.

(Signed) "G. B. LONGSTAFF,
"*Chairman.*

"23*rd July*, 1896."

II.—*Commercial History and Review of* 1896.

THE following is taken from the supplement to the *Economist* of 20th February, 1897, in continuation of similar extracts for previous years:—

"It says much for the vitality of the trade revival that began to make itself clearly manifest during the latter half of 1895, that it was maintained throughout 1896 in spite of many serious difficulties and drawbacks. Amongst the most prominent of these must be reckoned the disturbed condition of the United States. Apart from foreign questions, such as the Venezuelan dispute, and at a later date the proposed intervention in the affairs of Cuba, both of which had a very unsettling effect upon trade, the silver agitation during the autumn led to an almost unprecedented depression of business in the States. While the possibility of maintaining the gold standard was in doubt, nobody who could help it would enter into future contracts. To guard against contingencies, large amounts of gold were drawn out of the Treasury reserve and hoarded, and the banks, in order to protect themselves, not only charged almost prohibitive rates for loans and discounts, but many would-be borrowers, even of very good standing, found it impossible to obtain from them any accommodation at all. The country, in short, was brought to the brink of an industrial and financial crisis of the gravest character, and although that was happily avoided by the victory of the sound money party, and the favourable condition of the agricultural industry, which enabled the States to draw heavily upon the gold supplies on this side, deep business depression reigned for months, and only a very partial recovery has yet taken place. It was inevitable that with one of our chief customers reduced to such straits our trade should suffer, and some idea of the injury sustained may be gathered from the fact that the value of our exports to the States, which in 1895 amounted to 27,948,000*l*., fell in 1896 to 20,436,000*l*. Another impediment to the progress of our trade, and one of which, unfortunately, the worst effects have not yet been experienced, is the state of extreme distress to which millions of our fellow subjects in India have been reduced by famine and plague. Of course the relief expenditure mitigates to some extent the injury to business which these calamities inflict, but of their restrictive effect upon the trade of and with India as a whole there can be no question, especially when the extent to which that trade must be hampered by the stringent quarantine regulations enforced abroad is taken into consideration. And without venturing into the vexed question of the wisdom or unwisdom of the currency policy of the Indian Government, it must be added that the monetary stringency which has been developed in India in consequence of the closing of the mint has not been without some influence in limiting the volume of commercial transactions. Then, again, if we turn to South Africa we find that there also a state of things prevailed

during 1896 altogether incompatible with a healthy trade development. However opinions may differ as to the origin of the troubles in the Transvaal, the stagnation of the great mining industry of the Rand that has resulted from them is patent to all. That, in its turn, has crippled South African trade generally, as have also the insurrection in Rhodesia and the ravages of the rinderpest. It is true that in spite of all these adverse influences there was a considerable increase in our exports to South Africa last year. These were valued at 13,746,000*l.*, as compared with 10,581,000*l.* in 1895. That increase is partly due to the extension of the railway system, which the unsettlement in Rhodesia caused to be pushed on with greater vigour, and which will ultimately prove highly beneficial. The portion of the increase, however, which is to be accounted for by war expenditure and expenditure on armaments such as that by the Boer government must be classed in a different category; and it cannot be doubted that if the country had remained peaceful, and the mining industry progressive, there would have been a much better trade record to present. And yet another hindrance to trade in 1896 was the atmosphere of political unrest and apprehension in which all the great European powers moved, owing to the critical phase assumed by the Eastern question. Of course, the millions spent during the year in the strengthening of military and naval defences have stimulated certain branches of industry. They have, for instance, given a great impulse to our own shipbuilding and iron and steel trades. But it has to be remembered that the money for such purposes is not rained down into the Treasury from heaven. It is extracted from the pockets of the taxpayers, whose aggregate spending power is limited *pro tanto* as that of the Government is increased, while trade generally inevitably suffers when such political uncertainty prevails. As amongst other obstacles to trade might perhaps be mentioned the disturbed condition of certain South American States. That, however, was hardly an influence specially affecting 1896. For disturbances of that kind are perennial, and one or other of those States is always certain to be found in the throes of internal strife.

"Although, however, it was thus hampered in many ways, our foreign trade did not cease to make progress, as will be seen from the following statement, in which the figures for 1896 are compared with those for 1895:—

	1896.	1895.	Increase or Decrease.	
	£	£	£	Per ct.
Imports	441,807,000	416,690,000	+25,117,000	6·0
Exports of British products	239,922,000	225,890,000	+14,032,000	6·2
Re-exports	56,466,000	59,942,000	− 3,476,000	5·8
Total trade	738,195,000	702,522,000	+35,673,000	5·1

"The increase of 5·1 per cent. in the value of our total trade last year, as compared with 1895, contrasts with an increase of only 3 per cent. in 1895, as compared with 1894. Superficially, therefore, it would appear as if the expansion of our foreign trade had been proceeding last year at an accelerated pace. So far, however, as the volume of business is concerned, this was not the case, for whereas in 1895 the real growth was masked to some extent by a fall in prices, in 1896 it is exaggerated, if values alone are looked at, by a rise in prices. In Appendix A the returns are analysed so as to show to what extent the increase in the recorded value of our trade was due to an augmentation of its volume, and how much to higher prices. On reference to that statement it will be seen that the quantity of commodities imported by us for home consumption was larger in 1896 than in 1895 by 6·06 per cent.; the quantity of our exports of home products larger by 4·87 per cent., and the quantity of the imports and exports combined larger by 5·5 per cent. And these movements compare with those recorded in previous years thus :—

Volume of Our Foreign Trade. Increase or Decrease per Cent. as compared with previous Years.

	Imports Retained for Home Consumption.	Exports of Home Produce.	Imports and Exports.
	Per cnt.	Per cnt.	Per cnt.
1896.....	+ 6·06	+ 4·87	+ 5·50
'95.....	+ 5·54	+ 8·57	+ 6·66
'94.....	+ 9·95	+ 3·35	+ 7·39
'93.....	− 1·42	− 2·10	− 1·68
'92.....	+ 0·33	− 3·43	− 1·17
'91.....	+ 4·34	− 5·30	+ 0·25
'90.....	− 0·31	− 0·51	− 0·39

Larger receipts of food, of metals, and of manufactured and miscellaneous articles account for most of the growth shown in the imports, while amongst the exports the expansion, though it extended to nearly all our chief products, with the noteworthy exceptions of linen and woollen manufactures, was much the most marked in metals and machinery.

"There is, moreover, evidence which goes to show that the development of our home trade was greater than that of our foreign. It was mainly, for example, in meeting home requirements that our shipbuilding industry found the fuller employment it enjoyed, a corresponding stimulus being given to various branches of the iron and steel trade. The activity of the building trades is testified to by the largely increased consumption of timber. And dealing with more comprehensive statistics, we have the following record of the clearings at the London and chief provincial Bankers' Clearing Houses, which show in the aggregate an expansion much larger proportionately than that which took place in our foreign trade.

	1896.	1895.	Increase.	
	£	£	£	Per cent.
London Clearing House (exclusive of Stock Exchange and Consols pay day)	6,031,633,000	5,942,760,000	88,873,000	1·5
Manchester	193,573,500	169,720,100	23,853,400	14·05
Liverpool	120,406,000	111,777,300	8,628,700	7·7
Birmingham	49,589,300	40,999,300	8,590,000	20·9
Newcastle	54,621,300	41,980,200	12,641,100	30·1

"As an indication of the condition of trade the returns of the provincial Clearing Houses are of greater value than the London returns, as the latter are much more affected by Stock Exchange and financial transactions, and in the former the increase is very marked. Then, if we look to the railway traffic returns, we find that the fifteen chief English companies, whose accounts are summarised in Appendix B, earned in the carriage of merchandise and minerals 1,736,800*l.*, or 6·28 per cent., more in 1896 than in 1895. And as pointing to a sounder condition as well as an expansion of trade, it may be noted that, according to the statistics furnished by *Kemp's Mercantile Gazette*, the number of failures in the United Kingdom, which in 1894 amounted to 5,774, and in 1895 to 5,331, fell in 1896 to 5,166, the decrease in the number of bankruptcies last year as compared with 1895 being about 5 per cent., and that in deeds of arrangement nearly 7 per cent.

"It has already been stated that the prices of commodities were on the average slightly higher in 1896 than in 1895. The movement as registered by our index number is shown in the following statement, which gives the record quarter by quarter in each of the past two years and at the beginning of several previous years:—

	'Index Number,' representing the Combined Prices of Twenty-two Leading Commodities.		'Index Number,' representing the Combined Prices of Twenty-two Leading Commodities.
1st January, 1897	1950	1st April, 1895	1921
,, October '96	1958	,, January, '95	1923
,, July, '96	1947	,, ,, '94	2082
,, April, '96	1983	,, ,, '93	2121
,, January, '96	1999	,, ,, '92	2133
,, October, '95	2009	,, ,, '91	2224
,, July, '95	1931		

"According to this record, prices were lower at the end of 1896 than they were at the beginning. But, on the other hand, it shows that they never fell so low in 1896 as they did in 1895, and if the average of the figures be taken, the index number works out slightly higher in 1896 than in 1895. This, it may be observed, is contrary to what is shown by the index number which is compiled year by year by Mr. Sauerbeck, and is based upon the prices

of 45 commodities. That registers a fall from an average of 62 in 1895 to one of 61 in 1896 (the average of the eleven years 1867-77, being taken as 100). But the fact of a rise in prices is, it seems to us, established beyond question by the analysis of the trade and navigation returns given in Appendix A, to which reference has already been made. That shows that we paid 1·85 per cent. more for the imports we retained for home consumption in 1896 than we would have had to pay if we had bought them at the same average prices as in 1895, and that we got 1·63 per cent. more for our exports than they would have realised at the average prices of the previous year. And what the increase was as compared with years prior to 1895 the following table shows:—

Prices of Imports and Exports. Average Rise or Fall as compared with previous Years.

	Imports Retained for Home Consumption.	Exports of Home Produce.	Imports and Exports.
	Per cnt.	Per cnt.	Per cnt.
1896	+ 1·85	+ 1·24	+ 1·63
'95	− 3·54	− 3·48	− 3·52
'94	− 7·91	− 4·27	− 6·54
'93	− 2·26	− 1·71	− 2·05
'92	− 4·17	− 4·91	− 4·46
'91	+ 0·50	− 0·93	− 0·08
'90	− 1·38	+ 6·41	+ 1·78

Of course absolute accuracy is not to be looked for in the values put upon our imports and exports in the returns rendered by shippers to the Customs authorities. Any looseness in that respect, however, does not vitiate a broad comparison of one year with another, and a result obtained from a comparison which embraces all the articles of import and export must be more trustworthy than one which covers only a limited number of commodities. And what such a comparison shows is that the past year was the first since 1890 in which over that entire field of trade there was a rise in the average level of prices. It goes without saying that an advance in prices is by no means an unmixed advantage, but business is always more buoyant on a rising market.

"In the greater business prosperity of last year our working classes appear to have fully participated. Not only were they better employed, but they were able also to secure better rates of wages. The returns made by trade unions to the Labour Department of the Board of Trade show that while 4·8 per cent. of their numbers were out of employment at the end of 1895, only 3·2 per cent. were unemployed at the end of 1896. And a still better exhibit is made if instead of looking merely at the position at the end of the year we take the average of the monthly returns, and thus obtain a view of the state of employment throughout the whole year. Thus dealt with, the returns show an average

of 5·8 per cent. of the members of the unions unemployed in 1895, and an average of no more than 3·4 per cent. out of employment in 1896. Then as to wages. Reports were made to the Labour Department of changes in the rates of wages during the year affecting 601,200 persons. Of that number, we are told in the preliminary report of the Department, '375,000 received a net increase, 168,700 sustained a net decrease, and the wages of 57,500, although affected by upward and downward changes during the year, stood at the same level at the end as at the beginning. The estimated effect of all the changes on the weekly wages of the total number of workpeople affected was an average increase of 10*d.* per head.' Taking the principal groups of industries, the following table shows the distribution of the changes in 1896, and each of the three previous years :—

Average Amount of Increase or Decrease per Head per Week.

Groups of Industries.	1896.	1895.	1894.	1893.
	s. d.	*s. d.*	*s. d.*	*s. d.*
Building	+ 2 1	+ 1 $8\frac{1}{4}$	+ 1 5	+ 1 $5\frac{3}{4}$
Mining and quarrying	— — 6	— 1 $10\frac{3}{4}$	— 1 $8\frac{3}{4}$	+ — $11\frac{1}{4}$
Metal, engineering, and shipbuilding	+ 1 6	+ — $-\frac{1}{4}$	— — $7\frac{3}{4}$	— — $10\frac{3}{4}$
Textile	+ — 1	+ — $2\frac{1}{4}$	+ — $5\frac{1}{2}$	— — $4\frac{1}{4}$
Clothing	+ 1 1	+ 2 $-\frac{3}{4}$	+ 1 $4\frac{1}{2}$	+ 1 7
Miscellaneous	+ 1 10	— — $6\frac{1}{4}$	— — $3\frac{3}{4}$	— — 1
Employees of public authorities	+ 1 —	+ 1 $7\frac{1}{4}$	+ 1 $5\frac{3}{4}$	+ 1 $6\frac{3}{4}$
Average	+ — 10	— 1 $3\frac{1}{2}$	— 1 $4\frac{1}{4}$	+ — $5\frac{1}{2}$

And the comment of the Department on this table is that it will be seen from it 'that in 1896 the tendency of wages to fall, which had prevailed during the two preceding years, and but for the temporary effect of the great coal dispute in 1893 would have also been apparent in that year, ceased, and gave place to a rise.' It has to be remembered that these reports deal only with skilled labour, but the fact that there was a small decline in the proportion of paupers to total population at the end of 1896, as compared with 1895, would, so far as it goes, appear to indicate that the improvement extended to the lower strata as well, and certainly there is evidence of increased spending power among the people at large in the increased consumption of dutiable commodities, to which the following record bears testimony :—

Quantities Retained for Home Consumption.

	1896.	1895.	1894.
Tea ..... lbs.	227,786,000	221,800,000	214,341,000
Cocoa .... ,,	24,523,000	24,485,000	22,441,000
Coffee ..... cwts.	248,000	250,000	242,000
Tobacco ..... lbs.	69,593,000	66,369,000	65,505,000
Wines ..... galls.	15,861,000	14,636,000	13,846,000
Spirits, home ..... proof galls.	31,900,000	30,830,000	29,894,000
,, foreign .... galls.	8,218,000	8,253,000	7,642,000
Beer..... barrels	33,865,000	32,226,000	31,745,000

Even depressed agriculture had its head lifted up somewhat during 1896. The experience of farmers in different parts of the country varied greatly. Over the greater part of England the crops, which had been imperilled by, but happily survived a protracted drought, were reaped early, and under favourable conditions as regards the weather. In Scotland and the North of England, on the other hand, the harvest, which promised to be abundant, was spoiled by the heavy and continuous rains that began to fall just when it was ready to be gathered in, and left hardly a dry day for many weeks. Taken all round, however, the wheat crop was an exceptionally good one. The average yield per acre is estimated at 32·68 bushels, that being 4·87 bushels in excess of the average for the ten years ending 1896. It was further much above the average in quality, and what was still more important to the farmers, they were able to dispose of it at prices considerably higher than they were able to obtain in previous years. The highest official price of 33*s.* 4*d.* per quarter for English wheat, which was touched at the end of November, was, as will be seen from the following statement, fully 8*s.* per quarter above that ruling at the corresponding date in 1895, while the average for the twenty-two weeks from the beginning of August to the end of the year was 27*s.* 6*d.*, as compared with 24*s.* 7*d.* in the like period of 1895 :—

Gazette Average Price of Wheat (per Imperial Quarter) in United Kingdom immediately after Harvest, 1890-96, *and Total Average Gazette Price of Calendar Years.*

Periods.	1896.	1895.	1894.	1893.	1892.	1891.	1890.
	s. *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*	*s.* *d.*
After harvest.....	23 1	23 1	24 1	25 11	29 4	40 11	35 9
Calendar year average	26 2	23 1	22 10	26 4	30 3	37 –	31 11

Comparative Gazette Prices of Grain.

Week.	Wheat.						Barley.						Oats.					
	1896.		1895.		1894.		1896.		1895.		1894.		1896.		1895.		1894.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
Aug. 1	23	8	24	2	24	4	19	7	18	2	21	4	14	10	15	9	19	8
8	23	6	24	3	24	4	19	5	20	–	21	4	14	9	16	5	19	9
15	22	11	24	6	24	5	21	1	19	3	16	5	14	6	13	1	18	9
22	22	4	24	5	24	1	21	11	20	8	22	3	14	3	15	7	17	8
29	22	5	23	10	22	7	21	10	23	5	24	1	13	7	14	5	17	1
Sept. 5	23	1	23	1	21	7	21	11	23	4	24	11	13	11	14	4	16	6
12	23	9	22	10	20	5	23	4	23	11	23	9	14	1	13	3	15	9
19	24	–	22	7	19	8	24	8	24	2	23	5	14	6	13	9	15	2
26	24	4	23	–	18	9	26	3	24	8	23	5	14	1	13	5	14	3
Oct. 3	25	2	23	6	18	2	28	7	25	1	23	7	14	9	13	7	14	–
10	26	7	24	3	17	7	29	5	25	7	23	10	15	3	13	4	13	5
17	27	10	24	11	17	6	29	7	25	8	23	11	15	9	13	–	13	6
24	28	11	25	5	17	7	28	6	25	4	23	8	16	–	13	–	13	3
31	30	9	25	11	18	–	28	3	25	6	23	8	17	3	13	10	13	6
Nov. 7	31	6	26	4	18	4	27	5	25	4	23	–	17	6	14	4	13	7
14	31	9	26	1	19	1	27	3	25	1	22	7	17	7	14	4	13	10
21	32	11	25	7	19	11	26	8	25	1	22	4	17	7	14	3	14	3
28	33	4	25	2	20	7	26	9	24	7	22	–	17	7	14	–	14	3
Dec. 5	32	8	24	10	20	7	26	2	24	5	21	10	17	–	14	1	14	4
12	32	2	24	9	20	10	25	4	23	11	21	5	16	8	13	11	14	3
19	31	3	25	1	20	9	24	10	23	8	21	3	16	7	13	11	13	11
26	30	9	25	–	20	5	24	1	23	11	20	10	16	1	13	10	13	9

Barley also was above the average in yield, but to a large extent deficient in quality, while oats were a relatively poor crop. Lower prices, moreover, were obtained for cattle and dairy produce, but, taking the agricultural industry as a whole, it fared better in 1896 than for many previous years. And it has certainly enjoyed exceptionally favourable treatment at the hands of the Government, who have shifted on to other and even more heavily burdened shoulders a portion of the local taxation it has hitherto borne; while much more legitimate and more promising assistance has been afforded by the railway companies, who have not only lowered the rates for the carriage of agricultural produce, but have in a number of cases offered facilities for bringing the farmers into immediate touch with consumers, which, if they are properly taken advantage of, should be beneficial to both.

"He would be a bold man who, in the present critical state of affairs in the East, would venture to attempt a forecast of the probable course of business during the current year. The peace of Europe is hanging in the balance, and no one can say what a day may bring forth. But leaving the political factor aside, there are some reasons why better things may be hoped for this year than last. It is, for instance, reasonable to expect a more favourable condition of affairs in the United States than that which prevailed in 1896. True, the new administration is not showing itself so alive to the immediate necessity of currency reform as it ought to be, and is subordinating the sound money issue, which was the prominent one at the Presidential election, to

measures for increasing the already highly protective tariff. But the importance of placing the monetary arrangements of the country upon a sounder basis is recognised, and something in that direction will doubtless be undertaken. And while any increase of the customs duties is to be deprecated, trade will suffer much less from an actual raising of the tariff than from the uncertainty that now prevails. Then, our Australian colonies are gradually, though very slowly, recovering from their collapse in 1893, and their progress should be helped by the energy in which in most of them the gold mining industry is being prosecuted. It is to be hoped, too, that the worst of the troubles in South Africa are now over, while there and elsewhere developments of the railway systems, which not only give a stimulus to important branches of trade at the time, but open up new channels for commerce, are either being actively proceeded with or are being projected and prepared for. Unfortunately, as regards India there is no reason to look for any improvement, but rather the reverse. Our home trade, however, is still sound and progressive, and altogether, if political disturbances can be avoided, it seems probable that when the record of 1897 comes to be written it will present better results than those achieved in 1896, favourable though these were.

"The stagnation which brooded over the money market throughout the whole of 1894 and 1895 continued undisturbed throughout the first half of 1896, and indeed until the beginning of August, during which period there was a net influx of gold to the bank from abroad of over 3,000,000*l*., as the bank's stock of the metal, which at the beginning of the year stood at 44,960,000*l*., was increased to 47,880,000. In August, however, gold began to be withdawn for the United States, and early in September the bank raised its rate of discount, which, since February, 1894, had stood at 2 per cent., to 2½ per cent. This movement took the market quite by surprise, and there was a disposition to cavil at it. The prudence of it, however, was soon made manifest, for gold continued to flow in such volume to the States that a fortnight later the bank rate had to be raised to 3 per cent., that being followed a month afterwards by a further advance to 4 per cent., which rate was maintained until the end of the year. From the beginning of August until the end of December the net efflux of gold from the bank amounted to over 11½ millions, of which the great bulk went to the United States, partly as the result of financial operations on the other side, having for their object to maintain and supplement the Treasury gold reserve, but mainly because, as the States had greatly curtailed its imports while enormously increasing its exports, a huge trade balance was being piled up month by month in its favour. The rise in the bank rate was fairly well followed by the market, and as bankers were not only able to secure a better margin on their discounts and loans, but also to employ at higher rates amounts held on current account on which no interest is paid, they found the second half of the year a more satisfactory one in the matter of profits than they had experienced for a considerable time. While the gold

exports were the main influence affecting the market, another which acted in the direction of mitigating their effect must be noted. That was the release during the year of about 10,000,000*l.* of the Japanese indemnity money, which had been deposited at the Bank of England. These millions went, it is understood, in payment for war material and ships, and in the purchase of gold and silver, and their disbursement helped, of course, to increase the market supplies of money.

The following is our customary comparative table of rates:—

	1896.	1895.	1894.	1893.	1892.	1891.	1890.	1889.	1888.	1887.
Changes bank rate....	three	none	two	twelve	four	twelve	eleven	eight	nine	seven
	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.	Per cnt.
Highest „	4	2	3	5	3½	5	6	6	5	5
Lowest „	2	2	2	2½	2	2½	3	2½	2	2
Average „	2/10/5	2	2/2/1	3/1/4	2/9/11	3/5/11	4/10/4	3/14/10	3/6/3	3/6/-
Average market rate best three months' bills	1/7/7	15/11	19/3	2/2/-	1/9/5	2/10/-	3/13/11	2/15/6	2/7/-	2/7/3
Market below bank..	1/2/10	1/4/1	1/2/10	19/4	1/-/6	15/11	16/5	19/4	19/3	18/9

European Rates of Discount per Cent. per Annum, 1896.

Cities.	Beginning of Months of 1896.												
	Jan.	Feb.	Mar.	April.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Avge.
London.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
Bank rate	2	2	2	2	2	2	2	2	2	3	4	4	2·45
Open market	1⅛	1	1 3/10	⅝	⅞	1 3/16	⅝	¾	1⅛	2	3¼	3	0·80
Paris.													
Bank rate	2	2	2	2	2	2	2	2	2	2	2	2	2·09
Open market	1⅞	1¾	1¼	1¾	1⅝	1¾	1¾	1⅝	1½	2	2	1⅞	1·75
Vienna.													
Bank rate	5	4½	4	4	4	4	4	4	4	4	4	4	4·09
Open market	4⅞	4	3⅝	3¾	3⅝	3¾	3	3	3¾	4	4	3⅞	3·83
Berlin.													
Bank rate	4	4	3	3	3	3	3	3	3	4	5	5	3·65
Open market	2¾	2½	2⅛	2⅛	2¼	2⅝	2½	2½	2¾	3¾	4¼	4½	3·05
Frankfort.													
Bank rate	4	4	3	3	3	3	3	3	3	4	5	5	3·65
Open market	3	2⅝	2¼	2¼	2¼	2¾	2⅝	2⅝	2¾	3¾	4¼	4½	3·11
Amsterdam.													
Bank rate ...	2½	2½	3	3	3	3	3	3	3	3	3½	3½	3·02
Open market	2	1¾	1½	2⅜	2⅞	2½	2½	2⅝	1⅞	2⅜	3	3¼	2·44
Brussels.													
Bank rate	2½	2½	2½	2½	3	3	3	3	3	3	3	3	2·85
Open market	1⅝	1⅝	1⅝	1⅝	2⅛	2⅛	2	2	1⅞	2¼	2½	2¼	1·98
Hamburg.													
Bank rate	4	4	3	3	3	3	3	3	3	4	5	5	3·65
Open market	2¾	2½	2¼	2⅜	2¼	2⅝	2½	2½	2¾	3¾	4¼	4½	3·04
St. Petersburg													
Bank rate	6½	6½	6½	6½	6½	6½	6½	6½	6	6	6	6	6·33
Open market	6½	6½	6½	6½	6½	6½	6	6	5¼	5¼	5¼	5¼	6·10

"Upon the course of the silver market in 1896 Messrs. Pixley and Abell report as follows :—' The movements in the price of the metal during the year are much smaller than have been recorded for some time past. For some months there was a steady demand for the East, India showing an advance of over 1,000,000*l.* as compared with 1895. China, however, has been an uncertain buyer, and the total for the year will show shipments of less than half those of 1895. America has been a steady seller, and the totals from New York are largely in advance of those of last year. These amounts have been greatly added to by the large and increasing output of Mexico, whence many of the ore products have been sent to the States for treatment. In view of the Presidential elections in the States, and the determined efforts of the Silver party, a great deal of silver was purchased speculatively on the chance of Mr. Bryan's success. When the return of the gold candidate, Mr. McKinley, was assured, these amounts came on the market, and towards the close of the year rather lower prices became current. Indian exchanges rose rapidly late in the autumn, and as high as *1s.* 3 27-32*d.* was paid for India Council Bills. These movements were attended by corresponding falls in the bazaar price of silver, and accordingly silver received little or no benefit from them. Large quantities of bar silver were, however, sent to Bombay for coinage there into the British dollar for the Straits. Japan utilised a considerable portion of her war indemnity in the purchase of silver. The supply of Mexican dollars has again shown a decrease. For the greater part of the year the price has ruled at *1d.* under the silver quotation, but towards November large orders for Hong Kong and the Straits caused a substantial premium on these coins, and there are buyers at a difference of only $\frac{1}{2}d.$ from the price of silver for dollars which can be delivered in time for the Chinese new year :'—

Monthly Fluctuations in Price of Bar Silver.

	1896.		1895.		1894.		1893.		1892.	
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
January	30 7/8	30 1/2	27 7/16	27 3/16	31 3/4	30 1/2	38 9/16	38 1/8	43 3/4	41 3/4
February.....	31 9/16	30 3/4	27 1/16	27 1/4	30 11/16	27 1/4	38 1/2	38 1/4	41 5/16	41 1/8
March	31 9/16	31 1/8	29 3/4	27 5/8	27 7/8	27	38 3/8	37 9/16	41 5/8	39
April	31 3/16	30 13/16	30 7/8	29 7/8	29 3/8	29 1/8	38 5/16	38	40 1/8	39 1/4
May	31 1/4	30 15/16	30 7/8	30 3/16	29 1/4	28 1/16	38 9/16	37 5/8	40 3/8	39 11/16
June	31 1/16	31 3/16	30 1/16	30 3/16	28 15/16	28 5/16	38 1/4	30 1/2	41 1/8	40 1/16
July.....	31 1/2	31 3/8	30 5/8	30 3/16	28 15/16	28 7/8	34 3/4	32 1/8	40 1/4	39 1/16
August	31 3/8	30 3/8	30 9/16	30 1/4	30 1/8	28 11/16	34 7/8	32 1/16	39 1/16	37 5/8
September	30 11/16	30	30 9/16	30 7/16	30 1/4	29 3/16	34 1/2	33 7/8	38 5/16	38 1/8
October	30 5/16	29 3/4	31 3/8	30 5/8	29 9/16	28 15/16	34 1/8	31 1/2	39 1/8	38 1/4
November	30 3/16	29 5/8	31	30 5/8	29 5/16	28 3/8	32 3/4	31 1/2	39 1/4	38 3/8
December	30	29 13/16	30 11/16	30	28 1/2	27 3/16	32 5/16	31 1/4	39 3/16	37 15/16
Yearly avge.	30 3/4		29 7/8		28 15/16		35 5/8		39 13/16	
Highest price	31 9/16		31 3/8		31 1/4		38 3/4		43 3/4	
Lowest „	29 3/4		27 3/16		27		30 1/8		37 15/16	

"The increase in the new issues of capital offered for public

subscription in the United Kingdom, which had been more or less marked since 1893, became very much larger in 1896, when the aggregate amount reached a sum of 152,807,000*l.*, exceeding the total of any year since the 1889 company 'boom.' The expansion was most pronounced during the second and third quarters of the year, owing to the continuance of extreme ease in the money market, but the flotation of new companies was only temporarily checked by the successive advances in the bank rate, and for the last quarter a total of over 32,000,000*l.* was offered. The following is a comparison, quarter by quarter, for the past four years:—

New Capital Applications.

	1896.	1895.	1894.	1893.
	£	£	£	£
First quarter	30,925,000	28,479,000	11,358,000	7,770,000
Second ,, ...	48,569,000	23,710,000	19,719,000	18,179,000
Third ,, ...	41,287,000	32,742,000	18,140,000	8,951,000
Fourth ,, ...	32,026,000	19,759,000	42,618,000	14,241,000
	152,807,000	104,690,000	91,835,000	49,141,000

Classified as nearly as practicable in reference to the objects to which the capital raised during the year has been devoted, the statement is as follows:—

	£
Foreign Government loans	20,989,000
Indian and colonial Government loans	4,787,400
British corporation stocks.....	3,777,700
Colonial and foreign corporations	4,925,000
Home railways	7,735,000
Indian and colonial railways	5,448,000
Foreign railways	4,633,300
Mining companies—	
West Australian.....	6,447,700
New Zealand	1,902,000
Others	6,918,400
Land and finance companies.....	6,175,000
Cycles and appliances	17,187,100
Breweries and distilleries	18,162,200
Companies to acquire patents	2,285,000
Stores and trading companies	9,284,900
Manufacturing companies.....	8,851,900
Hotels, theatres, and entertainments	4,289,500
Lighting and water.....	2,693,100
Tea and coffee	1,357,000
Docks, harbours, and shipping.....	2,707,400
Horseless or motor cars.....	1,672.000
Miscellaneous	10,578,400
	152,807,000

The foreign government loans were about 1,350,000*l.* more than in the preceding year, but the amount of the Indian and colonial government loans were substantially smaller. Home railways figure for about a million more, while foreign and colonial railways were about the same as in 1895. In the aggregate, the mining commitments were about a million larger than in the previous year; but whereas South Africa accounted for nearly 5,000,000*l.* in 1895, in 1896 the issues for that destination were comparatively small, while an unusually large number of companies were being formed for mining purposes in the older Australian colonies, in the United States, in Mexico, and in Canada.

"The most striking feature in the year's company promotions was in the number and variety of cycle undertakings, ranging from the Dunlop reconstruction, with the writing-up of the capital from 3,000,000*l.* to 5,000,000*l.*, to companies started for manufacturing all sorts of cycle accessories. The applications during the year by breweries and distilleries mount up to the big total of over 18,000,000*l.* The following is a statement of the capital applications, and the calls made in each of the ten years ending 1896:—

	Capital Created and Issued.			Actual Money Calls.		
	In England.	England and Elsewhere.	Total.	In England.	England and Elsewhere.	Total.
	£	£	£	£	£	£
In 1896....	125,964,000	26,713,000	152,677,000	66,111,243	18,281,432	84,392,675
„ '95....	91,694,000	12,996,000	104,690,000	64,645,000	19,855,000	84,500,000
„ '94....	61,191,000	30,644,000	91,835,000	62,666,000	11,556,000	74,222,000
„ '93....	39,181,000	9,959,750	49,141,000	33,751,000	8,202,000	41,953,000
„ '92....	53,197,000	27,940,000	81,137,000	47,212,000	12,045,000	59,262,000
„ '91....	80,239,000	24,356,000	104,595,000	66,810,000	9,234,000	76,044,000
„ '90....	125,898,000	16,667,000	142,565,000	120,717,000	20,290,000	141,007,000
„ '89....	178,930,000	28,107,000	207,037,000	152,012,000	15,791,000	167,804,000
„ '88....	140,758,000	19,497,000	160,255,000	125,864,000	11,388,000	137,252,000
„ '87....	96,770,000	14,439,000	111,209,000	84,161,000	9,507,000	93,668,000

APPENDIX (A).—*Volume and Value of Our Foreign Trade of* 1896 *Compared with that of* 1895.

"For a number of years past it has been our practice to analyse the annual Trade and Navigation Returns, so as to show to what extent the recorded movements in values have been due to variations in the volume of the year's trade, and how far to alterations in prices. The details of this analysis for the year 1896 will be found in the numbers of the *Economist* of the 16th and 23rd January, and we now, as usual, bring together the main figures, in order that the broad results may be more clearly indicated:—

I. *Imports.*

	1896.		1895.
	Value in Trade and Navigation Returns.	Value Calculated at Prices of 1895.	Value in Trade and Navigation Returns.
	£	£	£
Living animals	10,439,000	11,015,000	8,966,000
Articles of food and drink	171,995,000	172,934,000	165,302,000
Tobacco	4,371,000	3,875,000	3,354,000
Metals	20,465,000	19,962,000	18,656,000
Chemicals, dye stuffs, and tanning materials	6,785,000	7,030,000	6,559,000
Oils	8,447,000	8,388,000	8,112,000
Raw materials for textile manufactures	74,766,000	67,614,000	70,770,000
Raw materials for sundry industries	47,241,000	46,047,000	44,025,000
Manufactured articles	81,250,000	80,719,000	75,601,000
Miscellaneous ,,	15,036,000	15,905,000	14,367,000
Parcel post	1,012,000	1,119,000	978,000
Total imports	441,807,000	434,608,000	416,690,000
Deduct re-exports	56,466,000	56,254,000	59,942,000
Net imports	385,341,000	378,354,000	356,747,000

II. *Exports of British Produce.*

	1896.		1895.
	Value in Trade and Navigation Returns.	Value Calculated at Prices of 1895.	Value in Trade and Navigation Returns.
	£	£	£
Living animals	941,000	939,000	793,000
Articles of food and drink	11,355,000	12,099,000	11,062,000
Raw materials	17,692,000	18,594,000	18,298,000
Yarn of all kinds	18,955,000	17,728,000	18,168,000
Textile fabrics of all kinds	86,398,000	83,638,000	83,209,000
Metals and machinery	50,610,000	49,915,000	44,037,000
Apparel and articles of personal use	10,473,000	10,093,000	9,307,000
Chemicals and chemical and medicinal preparations	8,244,000	8,872,000	8,289,000
All other articles	33,584,000	33,405,000	31,387,000
Parcel post	1,670,000	1,634,000	1,338,000
Total	239,922,000	236,887,000	225,890,000

"Dealing first with the volume of our trade, it is shown in Table I that in 1895 the total value of the imports retained for home consumption was 356,747,000*l.*, and that if we had paid for our net imports of last year the same average prices as in 1894, they would have cost us 378,354,000*l.* It follows therefore that there was last year an increase in the quantity of our net imports

equal to the difference between 356,747,000*l.* and 378,354,000*l.*, or 6·06 per cent. Then, as to our exports. In 1895 we exported British products to the value of 225,890,000*l.*, while our exports in 1896, if we had obtained for them the same prices as in 1895, would have realised 236,887,000*l.*; and the difference between these two amounts, which is 10,997,000*l.*, or 4·87 per cent., is the measure of the increase in the quantity of our shipment in 1894. Taking imports and exports together, the volume of our foreign trade last year (exclusive of re-exports) shows, as compared with 1893, an increase of 6·66 per cent., the figures being :—

	£
Actual value of net imports and of exports of British products in 1895	582,637,000
Value of net imports and of exports of British products in 1896, calculated at the prices of 1895	615,241,000
Increase in 1896, due to larger quantities	32,604,000
	= 5·50 per cent.

"Next, as to prices. The actual cost of our imports for home consumption last year was 385,341,000*l.*, whereas if we had been able to obtain them at the same average prices as in 1895 they would not have cost us more than 378,354,000*l.* Thus, owing to higher prices, there was an increase in the cost of our imports of 6,987,000*l.*, or 1·85 per cent., or, in other words, the prices of the imports were on the average 1·85 per cent. higher in 1896 than in 1895. And a somewhat similar movement is shown in the exports. Our total exports of British products in 1896 are valued at 239,922,000*l.* If, however, the value had been calculated at the same average prices as in 1895, it would not have exceeded 236,687,000*l.*, and there was thus an increase in value due to higher prices of 3,035,000*l.*, or 1·24 per cent. In imports and exports combined the increase in value amounted to 10,022,000*l.*, or 1·63 per cent., the calculation working out thus :—

	£
Value of net imports and of exports of British products for 1896, calculated at prices of 1895	615,241,000
Actual value in Trade and Navigation Returns	625,262,000
Difference due to higher prices in 1896	10,022,000
	= 1·63 per cent.

(B.)—*Railway Traffic Receipts in* 1896 *and* 1895

"Subjoined is an analysis of the traffic receipts of fifteen of the principal English railways during the past two years :—

First Half-Year.

[00's omitted.]

	Passengers, Parcels, and Mails.		Merchandise.		Minerals.		Live Stock.	
	1896.	1895.	1896.	1895.	1896.	1895.	1896.	1895.
	£	£	£	£	£	£	£	£
London and N. Western	2,381,7	2,196,7	2,071,1	1,954,5	1,166,9	1,135,7	89,9	86,6
Great Western	2,008,0	1,871,4	1,209,8	1,095,3	1,170,5	1,102,2	67,4	73,1
Midland	1,404,6	1,300,7	1,787,1	1,612,9	1,195,6	1,239,2	42,5	46,2
North Eastern	1,061,7	990,1	1,184,2	1,068,3	1,223,1	1,147,9	48,5	52,0
Lancashire & Yorkshire.	971,3	901,0	844,7	817,5	492,6	450,2	19,7	19,9
Great Northern	830,6	771,1	722,7	658,9	371,8	381,4	25,8	23,6
,, Eastern	1,083,8	1,004,0	615,2	578,8	217,5	228,3	40,4	42,5
London and S. Western.	1,219,2	1,130,8	386,7	369,2	150,7	151,1	17,5	17,8
South Eastern	759,3	711,2	188,4	178,5	85,2	85,7	6,1	6,5
London, Brighton	919,6	865,8	193,3	177,2	122,9	118,7	5,4	6,1
Manchester, Sheffield, &c.	284,6	270,5	473,7	429,2	337,9	330,1	10,2	10,1
London, Chatham, and Dover	497,5	459,6	81,0	74,0	53,1	54,2	2,6	2,6
North Staffordshire	117,3	108,1	121,2	115,9	106,5	105,9	2,0	2,0
Metropolitan	332,9	319,3	19,1	14,6	11,4	11,9	3	3
North London	161,6	155,2	59,0	54,6	16,0	15,7	7	9
Total	14,033,7	13,055,5	9,957,2	9,199,4	6,721,7	6,558,2	379,0	390,2
	+ £978,2		+ £757,8		+ £163,5		− £11,2	

Second Half-Year.

[00's omitted.]

London and N. Western	2,843,8	2,774,9	2,147,1	2,067,5	1,274,2	1,212,8	122,9	126,4
Great Western	2,410,2	2,346,5	1,222,9	1,208,7	1,278,5	1,199,5	74,3	79,0
Midland	1,639,7	1,596,1	1,942,6	1,819,4	1,390,1	1,326,7	44,9	52,2
North Eastern	1,322,5	1,290,3	1,271,8	1,200,8	1,305,6	1,242,6	49,5	55,2
Lancashire & Yorkshire.	1,088,1	1,051,2	889,0	863,8	512,0	482,4	21,0	20,2
Great Northern	989,8	942,7	794,7	748,8	432,9	413,6	19,5	21,3
,, Eastern	1,405,3	1,346,1	688,2	646,1	261,8	253,4	30,0	32,3
London and S. Western.	1,402,5	1,367,3	417,1	408,6	161,8	150,6	22,7	22,5
South Eastern	905,9	878,7	221,9	219,6	92,0	90,4	8,0	8,2
London, Brighton	1,075,4	1,070,6	201,3	196,8	137,3	129,6	5,9	6,1
Manchester, Sheffield, &c.	330,3	319,6	456,8	442,5	359,4	355,2	7,9	8,4
London, Chatham, and Dover	604,2	583,1	98,3	96,7	62,0	59,3	3,9	4,0
North Staffordshire	127,9	125,7	124,0	116,5	118,1	107,7	1,9	2,2
Metropolitan	333,1	325,5	22,6	15,3	13,9	12,7	3	3
North London	163,9	161,4	63,6	60,1	19,0	17,3	1,0	1,3
Total	16,642,6	16,179,7	10,561,9	10,111,2	7,418,6	7,053,8	413,7	439,6
	+ £462,9		+ £450,7		+ £364,8		− £25,	

III.—*Prices of Commodities in* 1896. By A. Sauerbeck.

The following table shows the course of prices of forty-five commodities during the last nineteen years as compared with the standard period of eleven years, 1867-77, which in the aggregate is equivalent to the average of the twenty-five years 1853-77 (see the Society's *Journal*, 1886, pp. 592 and 648, and 1893, pp. 220 and 247):—

Summary of Index Numbers. Groups of Articles, 1867-77 = 100.

	Vegetable Food (Corn, &c.).	Animal Food (Meat, &c.).	Sugar, Coffee, and Tea.	Total Food.	Minerals.	Textiles.	Sundry Materials.	Total Materials.	Grand Total.	Silver.*	Wheat Harvest.†	Average Price of Consols.‡	Average Bank of England Rate.‡
1878	95	101	90	96	74	78	88	81	**87**	86·4	108	95 3/16	3 3/4
'79	87	94	87	90	73	74	85	78	**83**	84·2	64	97 1/2	2 3/8
'80	89	101	88	94	79	81	89	84	**88**	85·9	93	98 3/8	2 3/4
'81	84	101	84	91	77	77	86	80	**85**	85·0	97	100	3 1/2
'82	84	104	76	89	79	73	85	80	**84**	84·9	100	100 1/2	4 1/8
1883	82	103	77	89	76	70	84	77	**82**	83·1	93	101 3/16	3 9/16
'84	71	97	63	79	68	68	81	73	**76**	83·3	103	101	3
'85	68	88	63	74	66	65	76	70	**72**	79·9	108	99 1/4	3
'86	65	87	60	72	67	63	69	67	**69**	74·6	93	100 3/4	3
'87	64	79	67	70	69	65	67	67	**68**	73·3	110	101 3/4	3 3/16
1888	67	82	65	72	78	64	67	69	**70**	70·4	96	101	3 3/16
'89	65	86	75	75	75	70	68	70	**72**	70·2	103	98	3 6/16
'90	65	82	70	73	80	66	69	71	**72**	78·4	106	96 1/2	4 5/16
'91	75	81	71	77	76	59	69	68	**72**	74·1	108	95 3/4	3 3/16
'92	65	84	69	73	71	57	67	65	**68**	65·4	91	96 3/4	2 5/16
1893	59	85	75	72	68	59	68	65	**68**	58·6	90	98 1/2	3 1/16
'94	55	80	65	66	64	53	64	60	**63**	47·6	106	101	2 1/16
'95	54	78	62	64	62	52	65	60	**62**	49·1	91	106	2
'96	53	73	59	62	63	54	63	60	**61**	50·5	116	111	2 5/16
Average 1887-96	62	81	68	70	71	60	67	66	**68**	63·8	102	100 1/2	3
'78-87	79	95	76	84	73	71	81	76	**79**	82·1	97	99 1/2	3 2/16

* Silver 60·84 per oz. = 100.

† Wheat harvest in the United Kingdom, 1878-83, 28 bushels per acre = 100, from 1884, 29 bushels = 100.

‡ Consols and bank rate actual figures, not index numbers; consols 2 3/4 per cent. from 1889.

The index number for all commodities was 61, against 62 in 1895, or 39 per cent. below the standard period 1867-77, 23 per cent. below the ten years 1878-87, and 10 per cent. below the average of the last ten years. The index number is the lowest on record, and this is principally caused by the unprecedentedly low prices—in the aggregate—of articles of food. Some articles—wheat, barley, rice, and butter—were indeed higher than in the previous year, though the difference of the annual averages was not very great, but maize and potatoes were lower than ever, and

all classes of meat were distinctly cheaper than in 1895. Prime beef and mutton had been lower in 1887 and before 1869, but middling and inferior beef and mutton, and pork and bacon have not experienced such low averages since 1852. Sugar was on the average, if anything, rather higher, owing to speculative movements early in the year, but coffee, particularly the lower kinds, was much cheaper. In the case of materials, iron, copper, and lead, cotton, jute, merino wool, and timber were higher. Tin, coals, hemp, English wool, hides, tallow, palm oil, olive oil, linseed oil, and petroleum were lower.

Eleven articles out of 45 contained in my tables showed in the course of the year records of lowest prices, viz., barley, oats, maize, house coals in London, Manila hemp, tallow, olive oil, and linseed oil, the lowest of the century; and potatoes, pork, and bacon, the lowest since 1852.

The monthly fluctuations were as follows:—

December, 1889....	73·7	November, 1895....	62·3	July, 1896....	59·2
„ '90....	71·1	December, „	61·2	August, „	59·7
„ '91....	71·4	January, 1896 ...	61·4	September, „	61·3
„ '92....	67·7	February, „	61·4	October, „	62·6
„ '93....	67·0	March, „	60·7	November, „	62·6
„ '94....	60·1	April, „	60·3	December, „	62·0
February, 1895....	60·0	May, „	60·1	January, 1897....	62·0
September, „	63·5	June, „	59·3	February, „	61·9
October, „	63·3				

Prices remained fairly steady early in the year, but afterwards the tendency of the majority of articles was downwards until July, when the lowest point on record was touched. Since then the index number has been mainly influenced by the rise of wheat and flour, barley and oats, while maize and potatoes remained on a low level, and sugar, coffee, and tea were cheaper than in the first half of the year. Materials improved to some extent, but textiles were again weaker in December.

Taking articles of food and materials separately, the index numbers compare thus:—

	February.	September.	December. 1895.	July.	October.	November.	December, 1896.
Food	63·8	64·3	60·4	60·0	64·7	64·6	63·9
Materials....	57·0	62·9	61·8	58·6	61·1	61·2	60·6

While articles of food stood at the end of the year 6 per cent. higher than at the end of 1895, materials were 2 per cent. lower, and the rise of the general average only amounted to 1 per cent.

The average price of silver was $30\frac{3}{4}d.$, against $29\frac{7}{8}d.$ in 1895. It was strongly favoured by the Russian currency requirements, which absorbed a fair proportion of the production, and also by a good demand for India and Japan. It stood at $30\frac{9}{16}d.$ (index number 50·2) at the end of 1895, improved in February, and was worth about $31\frac{1}{4}d.$ on the average from March to July; since then

it declined gradually and stood at $29\frac{13}{16}d.$ (index number 49·0) at the end of 1896.

*Quarterly Movements of Prices.**

Summary of Index Numbers, 1867-77 = 100.

Years.	Quarters.	Vegetable Food (Corn, &c.).	Animal Food (Meat, &c.).	Sugar, Coffee, and Tea.	Total Food.	Minerals.	Textiles.	Sundry Materials.	Total Materials.	Grand Total.	Silver †
1889....	IV	66·3	86·0	67·2	73·1	83·9	70·7	68·1	73·2	**73·2**	71·4
'90....	IV	67·4	82·0	71·2	73·6	80·5	62·7	69·5	70·4	**71·7**	79·6
'91....	IV	77·2	80·8	68·7	76·7	73·9	58·6	69·0	67·1	**71·2**	72·1
'92....	IV	60·7	83·6	72·7	71·7	69·5	57·3	67·4	64·9	**67·7**	64·0
'93....	IV	58·6	83·2	70·5	70·2	72·3	58·7	67·2	66·0	**67·8**	52·2
'94	I	57·0	80·3	69·0	68·1	65·8	56·8	65·1	62·7	**65·0**	47·3
	II	54·4	79·7	66·8	66·3	62·9	55·3	64·3	61·1	**63·3**	47·2
	III	54·8	80·4	63·8	66·1	63·0	53·0	63·9	60·3	**62·8**	48·4
	IV	53·2	78·4	60·8	64·1	62·3	48·2	63·5	58·5	**60·9**	46·6
'95	I	54·2	77·3	61·3	64·2	60·8	46·5	63·1	57·3	**60·3**	46·4
	II	57·9	77·5	60·9	65·8	61·3	49·8	65·5	59·6	**62·2**	50·0
	III	53·7	80·3	61·2	65·1	63·5	54·6	66·1	61·9	**63·2**	50·0
	IV	51·6	74·0	62·2	62·1	63·8	56·8	65·5	62·4	**62·3**	50·5
'96	I	50·4	71·7	62·8	60·8	63·2	55·5	64·5	61·4	**61·1**	51·1
	II	49·2	71·4	61·2	59·9	62·4	53·7	62·8	59·9	**59·9**	51·4
	III	50·5	75·2	56·6	60·9	62·2	53·2	62·1	59·4	**60·1**	50·6
	IV	60·3	74·3	55·2	64·4	65·9	54·1	62·8	60·9	**62·4**	49·1

* The four quarterly figures of each year do not in all cases exactly (in the decimals) agree with the annual averages, as the latter are partly calculated from revised figures. See also the Society's *Journal*, 1893, p. 221, and 1895, p. 144.

† Silver 60·84*d.* per oz. = 100.

The quarterly numbers show the average of three monthly figures, and by thus eliminating minor fluctuations they give a more reliable comparison of the gradual changes of the various groups of commodities. They show the decline for all groups of commodities in the second quarter, the further fall of sugar and coffee in the second half of the year, and the sharp rise of vegetable food, and the improvement of minerals and textiles in the last quarter.

The following figures show in each case the average index numbers of all the forty-five commodities for ten years (see the dotted line in the diagram of the *Journal*, 1886); they give the best picture of the gradual movement of the *average* prices of *whole periods*, as the ordinary fluctuations are still further obliterated:—

1818–27 = 111	1874–83 = 90	1881–90 = 75
'28–37 = 93	'75–84 = 87	'82–91 = 74
'38–47 = 93	'76–85 = 85	'83–92 = 72
'48–57 = 89	'77–86 = 82	'84–93 = 71
'58–67 = 99	'78–87 = 79	'85–94 = 69
'68–77 = 100	'79–88 = 78	'86–95 = 68
	'80–89 = 76	'87–96 = 68

The improvement in *general trade* noticed since the middle of 1895 made further progress in several branches during the past year, while other branches were unfavourably affected by the uncertainty of affairs and the return of depression in the United States. Other countries in nearly every direction, the East and Australia, South America and South Africa, have considerably increased their purchases; agriculturists in Europe and North America ought to be in a rather better position in view of the higher prices of wheat, rye, and barley; the iron and shipbuilding trades are very busy, and the exports of manufactured iron, of railway material and machinery, prove that there is again more enterprise. It is therefore surprising that prices, particularly of raw materials, but also of some articles of food, cannot be lifted to a greater extent, and the only explanation, apart from the lack of confidence in the United States, is that either the present supply or the general increase of production during the last ten years has been so great that consumption has been unable to cope with it.

Referring to the last two years in particular, we have to record a decline in production and a welcome improvement in prices for all sorts of corn, except maize, the crops of which were enormous; of sugar and cotton, after excessive crops in 1894-95, the 1895-96 production was reduced, to be followed again by very large supplies for 1896-97. The production of coffee and tea in 1896 was also larger, that of wool, which in 1895 had reached a very high figure, was however smaller. The world's production of iron and coals during the last two years was the largest on record, and so was the supply of meat in the United Kingdom. Copper has enormously increased, but for the moment the demand appears to have overtaken the supply, and the latter is also the case with an article not contained in my tables, viz., indiarubber.

Of political and other events, we have to mention the South African troubles at the beginning of the year, then the renewed Armenian difficulties and the insurrection in Crete, the silver agitation and the Presidential contest in the United States, the continuation of the revolution in Cuba with another message of the American President, the Hamburg Dock Strike, and early in the present year the Indian Famine, and the serious aspect of the Eastern question.

The hope was generally entertained that the election of Mr. McKinley as President of the United States would cause a return of confidence and an amelioration in that country, particularly as, thanks to the rise of wheat, and the large exports of the country, gold was again attracted in considerable amounts, but it must be admitted that so far this hope has been sadly disappointed. The present position of the trade of the United States is most peculiar, and it may be of interest to compare the following figures of imports and exports for the *Calendar Year* (in million dollars and decimal):—

Year.	Merchandise and Silver.			Gold.			Total Excess of Exports over Imports.	Estimated Metallic Monetary Stock at End of Year.	
	Imports.	Exports.	Excess of Exports over Imports.	Imports.	Exports.	Excess of Exports over Imports.		Gold.	Silver Legal Tender and Bullion.
1885	605·6	721·5	115·9	23·6	11·4	(12·2)	103·7	613·0	222·1
'86	680·6	740·5	59·9	41·3	41·3	—	59·9	640·4	254·4
'87	725·6	742·9	17·3	44·9	9·2	(35·7)	(18·4)	704·7	293·1
'88	741·3	721·7	(19·6)*	11·0	34·5	23·5	3·9	704·6	326·0
'89	789·7	867·8	78·1	12·0	50·9	38·9	117·0	689·5	360·5
'90	845·8	884·0	38·2	20·2	24·0	3·8	42 0	704·1	408·3
'91	846·5	998·2	151·7	45·0	79·1	34·1	185·8	686·8	465·5
'92	862·6	974·4	111·8	17·4	76·5	59·1	170·9	651·3	514·6
'93	794·5	922·4	127·9	72·8	79·8	7·0	134·9	666·9	546·5
'94	686·1	872·2	186·1	20·6	101·8	81·2	267·3	625·1	547·4
'95	813·0	878·7	65·7	32·5	104·6	72·1	137·8	597·9	547·9
'96	694·1	1068·9	374·8	102·7	56·7	(46·0)	328·8	692·9	554·0

* Figures in parentheses are excess imports.

Such official statistics of imports and exports cannot give the exact balance of trade, but so far as they go they show that from 1885-88 the total excess exports amounted to $149 millions, or $37 millions annually, which certainly was not enough to pay for the indebtedness, probably something like $100 millions a year, and European capital must have been invested in the United States to a considerable extent. In the following four years, from 1889-92, under the influence of increased silver coinages and the Silver Purchase Act of 1890, the excess exports reached $516 millions, or $129 millions per annum, while during the last four years, 1893-96, they were $869 millions, or $217 millions per annum on the average. There is no doubt that owing to the lack of confidence in the maintenance of gold payments, large amounts of European capital have been gradually withdrawn, and American securities returned to the States. Of late, the excess of exports has, however, been so great, that it is only reasonable to assume that the country will soon have to increase the imports of goods again, with the effect of improving prices.

The production of gold during the ten years 1886-95 was as follows, according to the Director of the Mint at Washington (*see* also the Society's *Journal*, 1893, p. 231).

	Kilos. Fine.	Value. £		Kilos. Fine.	Value. £
1886	159,700	= 21,700,000	1891	196,600	= 26,800,000
'87	159,200	= 21,700,000	'92	220,900	= 30,200,000
'88	165,800	= 22,600,000	'93	237,000	= 32,400,000
'89	185,800	= 25,400,000	'94	273,200	= 37,300,000
'90	178,800	= 24,400,000	'95	301,500	= 41,200,000

It is estimated that in 1896 the production reached 43,000,000*l.*

As it is frequently asked, what has become of all this gold, it may be useful to draw up a balance sheet such as was done in my paper in 1893 for the period since 1885. This is as follows:—

Production in the eleven years 1886–96		£327	millions.
Used in the arts and manufactures in Europe and North America, 12 million £ per annum	£132		
Net quantity retained by other countries, the East, Africa, Central and South America	50[2]		
	——	182	„
Available for monetary purposes in Europe, North America, and Australia.....		145	„

Russia increased her stock in the same period from 35 to 115 million £, and Austria from 6 to 42 million £, and thus these two countries absorbed alone 116 million £, while their paper circulation was increased by 30 million £ only. 86 million £ have therefore merely served for additional cover, or hoards, and not for additional currency. For all the other countries the small balance of 29 million £ was left, and if Central European banks have increased their stocks to a greater extent, it must have been withdrawn partly from circulation in connection with the constant and large increase of deposit banking, and partly from other countries, Italy, Spain, Portugal, &c. The net addition to the monetary circulation, so far as caused by the production of gold, was only 59 million £ (29 + 30) during the last eleven years, but there was an addition of nearly 100 million £ silver money.

Should the production continue at the rate of 43 million £, with requirements of 12 million £ in arts and manufactures, and 5 million £ for Asia, Africa, and South America, there would be a balance of 26 million £, which would be a good addition to the currency if there were no extra demands, but extra demands are always turning up. Besides any requirements of Italy, Spain, Portugal, Greece, and South America, countries with inconvertible paper, there are principally to be considered Japan and the United States. The former has decided to introduce a nominal gold standard, and it is now confidently expected that the latter will do something to reduce the great quantity of paper money in circulation, and if only the old legal tender notes, of which there are 347 million $, covered by a reserve of 100 million $, are withdrawn—which ought to have been done some thirty years ago—it will require about 50 million £ gold.

[2] The production of those countries plus exports thereto from the United Kingdom and the United States, less imports, amounted to 61 million £ during the eleven years. Making allowance for imports by other European countries, which cannot be very important, and for gold contained in exported ore and in other metals, partly or entirely credited to the production of those countries, the above total of 50 million £ will probably be a fairly exact estimate. The amounts were particularly heavy in 1888-89 and 1895-96.

The arithmetical mean of the 45 index numbers, which is 61 (against 62 in 1895), has, as in former years, again been subjected to two tests:—

Firstly, by using the same index numbers of the separate articles, but calculating each article according to its importance in the United Kingdom on the average of the three years 1889-91, when the mean for 1896 is 60·4, against 60·8 in 1895; or on the average of the five years 1871-75, when the mean for 1896 is 60·2, against 60·8 in 1895.

Secondly, by calculating the quantities in the United Kingdom at their actual values (the production on the basis of my price tables, the imports at Board of Trade values, and consequently a considerable portion according to a different set of prices) and at the nominal values on the basis of the average prices from 1867-77. In this case the mean is 62, or the same as in 1895. According to this test there is no further fall, and the declared values, particularly of articles which followed a downward course after the first quarter, must therefore have been somewhat higher than the prices of the standard descriptions.

The following table gives the figures which have served for the second test (see also the Society's *Journal*, 1886, pp. 613—19):—

Movements of Forty-five Commodities in the United Kingdom (Production and Imports).

	Estimated Actual Value in each Period.	Nominal Values at Average Prices of 1867-77, showing Increase in Quantities.	Movement of Quantities,		Movement of Quantities from Period to Period.	Ratio of Prices according to this Table, 1867-77 = 100.
			1848-50 = 100.	1871-75 = 100.		
	Mln. £'s and dec.	Mln. £'s and dec.				
Avge. 1848-50....	219·8	294·8	100	56	—	74·6
„ '59-61....	350·1	382·7	130	73	30% over 1849	91·5
„ '69-71....	456·6	484·6	164	92	27% „ '60	94·2
„ '71-75....	548·8	526·3	178	100	—	104·3
„ '74-76....	537·8	538·4	183	102	—	99·9
„ '79-81....	489·7	578·5	196	110	19% over 1870	84·6
„ '84-86....	445·7	610·1	207	116	—	73·0
„ '89-91....	504·1	685·2	233	130	18% over 1880	73·6
1894.....	453·6	703·0	238	133	—	64·5
'95.....	449·5	725·5	246	138	—	62·0
'96*	460·0	741·5	251	141	8% over 1890	62·0

* 1896 subject to correction after publication of the complete mineral produce returns.

The nominal values at the uniform prices of 1867-77 show the exact movements of quantities in the aggregate. The quantities were last year 8 per cent. larger than in 1889-91, 41 per cent. larger than in 1871-75, and 151 per cent. larger than in 1849. The real value was barely 1 per cent. more than the average of 1869-71, although the quantities have since increased by 53 per cent.

The price movements of the external trade of this country—total imports into the United Kingdom and exports of British and Irish produce—were as follows, 1873 called 111, in accordance with my index number:—

	Total Imports into United Kingdom and Exports of British and Irish Produce.			Ratios 1873 = 111.	
	Declared Value.	Value at Prices of Preceding Year.	Values* at Prices in 1873.	British Trade.	My Arithmetical Index Numbers.
	Mln. £'s	Mln. £'s.	Mln. £'s.		
1873	626·0	—	626	111·0	111
'83	667·0	--	861	86·0	82
'84	623·0	—	844	81·9	76
'85	584·0	—	835	77·7	72
'86	562·5	—	858	72·8	69
'87	583·3	588·6	898	72·1	68
'88	620·3	609·4	938	73·4	70
'89	675·3	664·5	1,005	74·6	72
'90	684·4	672·7	1,001	75·9	72
'91	683·0	684·8	1,001	75·7	72
'92	651·0	681·4	999	72·3	68
'93	623·6	635·7	976	70·9	68
'94	624·7	666·5	1,043	66·5	63
'95	642·9	666·6	1,112	64·1	62
'96	681·7	671·5	1,162	65·1	61

* 1883-86 calculated by the Board of Trade ("Report on Recent Changes in the Prices of Exports and Imports, 1888"), 1887-96, nominal figures in proportion with the ratio in the next column. This ratio is based on the figures in the first two columns, published by Mr. S. Bourne and the *Economist*, showing the trade movements and variations in value from year to year, viz., values as returned and calculated at prices of previous year (583·3 : 72·7704 = 588·6 : 72·1152).

While my index number shows a reduction of 1 point, the total trade shows a rise of 1 point. For this difference the following explanation may be given: (1) That the declared values as already mentioned, particularly of articles which declined after the first quarter, must have been higher than the course of the standard descriptions. (2) That some commodities not contained in my tables, principally wine, tobacco, and india-rubber were higher than in the previous year. (3) That the trade returns do not include the large quantities of meat and potatoes produced in the United Kingdom, which ruled considerably lower than in 1895.

Construction of the Tables.

The Table of *Index Numbers* is based on the average prices of the eleven years 1867-77, and the index numbers have been calculated in the ordinary arithmetical way; for instance, English wheat:—

	s.	*d.*	
Average, 1867-77....	54	6	= 100, average point.
,, '55	74	8	= 137, or 37 per cent. above the average point.
,, '96	26	2	= 48, ,, 52 ,, below ,,

The index numbers therefore represent simple percentages of the average point.

Certain articles which appear to have something in common have been grouped together, with the following result:—

		Example for 1896.	
		Total Numbers.	Average.
1. Vegetable food, corn, &c. (wheat, flour, barley, oats, maize, potatoes, and rice)	With 8 Index Nos.	425	53
2. Animal food (beef, mutton, pork, bacon, and butter)	,, 7 ,,	512	73
3. Sugar, coffee, and tea	,, 4 ,,	236	59
1—3. *Food*	,, 19 ,,	1,173	62
4. Minerals (iron, copper, tin, lead, and coals)	,, 7 ,,	441	63
5. Textiles (cotton, flax, hemp, jute, wool, and silk)	,, 8 ,,	435	54
6. Sundry materials (hides, leather, tallow, oils, soda, nitrate, indigo, and timber)	,, 11 ,,	690	63
4—6. *Materials*....	,, 26 ,,	1,569	60
General average	,, 45 ,,	2,742	61

The *general average* is drawn from all 45 descriptions, which are treated as of equal value, and is the simple arithmetical mean as shown above.

*Average Prices of Commodities.**

No. of Article / Year.	0	1	2	3	4	5	6	7	8	1—8	9
		Wheat.		Flour.	Barley.	Oats.	Maize.	Potatoes.*	Rice.		Beef.‡
	Silver.†	English Gazette.	American.	Town Made White.	English Gazette.	English Gazette.	American Mixed.	Good English.	Rangoon Cargoes to Arrive.	Vegetable Food. Total.	Prime.
	d. per oz.	*s.* and *d.* per qr.	*s.* and *d.* per qr.	*s.* per sack (280lbs.).	*s.* and *d.* per qr.	*s.* and *d.* per qr.	*s.* per qr.	*s.* per ton	*s.* and *d.* per cwt.		*d.* per 8 lbs.
1882.....	51⅛	45·1	48·6	40	31·2	21·10	31	95	7·5	—	60
'83.....	50 9/16	41·7	45	36	31·10	21·5	27¾	105	8·1	—	61
'84.....	50 1/16	35·8	36·6	31	30·8	20·3	25¼	75	7·8	—	58
'85.....	48⅜	32·10	35	29	30·1	20·7	23	75	7	—	52
'86.....	45⅜	31	35	28	26·7	19	21	80	6·7	—	49
1887.....	44⅝	32·6	34	28	25·4	16·3	21¼	85	6·10	—	43
'88.....	42⅞	31·10	37	30	27·10	16·9	23½	80	7·1	—	48
'89.....	42 1/16	29·9	35	29	25·10	17·9	20	80	7·3	—	47
'90.....	47 1/16	31·11	35·6	29	28·8	18·7	20	70	7·3	—	47
'91.....	45 1/16	37	40	33	28·2	20	28	92	7·11	—	47
1892.....	39 3/16	30·3	33	28	26·2	19·10	21¾	70	7·8	—	47
'93.....	35⅝	26·4	27·6	26	25·7	18·9	20	65	6·2	—	48
'94.....	28 15/16	22·10	23·6	22	24·6	17·1	20	70	5·10	—	47
'95.....	29⅞	23·1	25·6	23	21·11	14·6	19½	80	5·6	—	47
'96.....	30¾	26·2	29	25	22·11	14·9	15	55	6·2	—	45
Average 1887-96	38¾	29	32	27	25½	17½	21	75	6¾	—	46½
'78-87	50	40	43½	34½	31⅓	21	25	102	8	—	55½
'67-77	58½	54½	56	46	39	26	32½	117	10	—	59
	Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.										
1882.....	84·9	83	87	87	80	84	95	81	74	671	102
'83.....	83·1	76	80	78	82	82	85	90	81	654	104
'84.....	83·3	65	65	65	79	78	78	64	77	571	98
'85.....	79·9	60	62	63	77	79	71	64	70	546	88
'86.....	74·6	57	62	61	68	73	65	69	66	521	83
1887.....	73·3	60	61	61	65	63	65	73	68	516	73
'88.....	70·4	58	66	65	71	64	72	69	71	536	81
'89.....	70·2	55	63	63	66	69	61	69	72	518	80
'90.....	78·4	59	63	63	73	72	61	60	72	523	80
'91.....	74·1	68	71	72	72	77	86	79	79	604	80
1892.....	65·4	56	59	61	67	76	67	60	77	523	80
'93.....	58·6	48	50	54	66	72	61	56	62	469	81
'94.....	47·6	41	42	48	63	66	61	60	58	439	80
'95.....	49·1	42	46	50	56	56	60	68	55	433	80
'96.....	50·5	48	52	54	59	57	46	47	62	425	76

* The annual prices are the averages of twelve monthly or fifty-two weekly quotations; potatoes of eight monthly quotations, January to April and September to December.

† Index numbers of silver as compared with 60·84*d.* per ounce being the parity between gold and silver at 1 : 15½; not included in the general average.

‡ Meat (9—13), by the carcase, in the London meat market.

Average Prices of Commodities—Contd.

No. of Article	10	11	12	13	14	15	9—15	16A	16B	17	18A*	18B*
	Beef.	Mutton.		Pork.	Bacon.	Butter.		Sugar.			Coffee.	
Year.	Mid-dling.	Prime.	Mid-dling.	Large and Small, Average.	Water-ford.	Fries-land, Fine to Finest.	Animal Food. Total.	British West Indian Refining.	Beet, German, 88 p. c., f.o.b.	Java, Floating Cargoes.	Ceylon Planta-tion, Low Mid-dling.	Rio, Good Channel.
	d. per 8 lbs.	*d.* per 8 lbs.	*d.* per 8 lbs.	*d.* per 8 lbs.	*s.* per cwt.	*s.* per cwt.		*s.* per cwt.	*s.* per cwt.	*s.* per cwt.	*s.* per cwt.	*s.* per cwt.
1882.....	51	72	60	51	74	125	—	20	21½	25½	65	39
'83.....	51	73	61	49	72	123	—	19	20¼	24½	76	43
'84.....	49	64	53	48	70	120	—	13¼	13¼	17½	62	47
'85.....	44	56	47	45	68	111	—	13½	14¼	17½	60	39
'86.....	40	62	50	45	67	100	—	11¾	11¾	14¼	68	46
1887.....	36	52	42	43	61	103	—	11¾	12½	14½	90	78
'88.....	39	58	47	40	61	100	—	13	12¾	16	80	64
'89.....	39	63	50	43	66	102	—	16	16½	19	95	76
'90.....	38	59	45	42	62	100	—	13	12½	15¼	101	83
'91.....	40	53	42	39	63	106	—	13½	13½	15½	101	76
1892.....	38	53	42	48	68	108	—	13½	13¾	16	104	68
'93.....	39	53	42	50	68	106	—	14¼	15	17¼	103	81
'94.....	37	55	42	44	59	98	—	11¼	11¼	13¾	102	75
'95.....	37	58	44	37	54	93	—	10	10	12	98	74
'96.....	34	53	39	35	50	98	—	10¾	10½	12½	95	58
Average 1887-96	37½	55½	43½	42	61	101	—	12¾	13	15¼	97	73
'78-87	46	64½	53	49	71	116	—	17	18	21½	78	52
'67-77	50	63	55	52	74	125	—	23	24	28½	87	64

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

											*	*
1882.....	102	114	109	98	100	100	725	87		89	75	61
'83.....	102	116	111	94	97	98	722	84		86	87	67
'84.....	98	102	96	92	95	96	677	56		62	91	74
'85.....	88	89	85	87	92	89	618	59		62	69	61
'86.....	80	98	91	87	91	80	610	50		50	78	72
1887.....	72	83	76	83	82	82	551	52		51	104	122
'88.....	78	92	85	77	82	80	575	57		56	92	100
'89.....	78	100	91	83	89	82	603	69		67	109	119
'90.....	76	94	82	81	84	80	577	54		54	116	130
'91.....	80	84	76	75	85	85	565	57		54	116	119
1892.....	76	84	76	92	92	86	586	58		56	120	106
'93.....	78	84	76	96	92	85	592	62		61	118	127
'94.....	74	87	76	85	80	78	560	48		48	117	117
'95.....	74	92	80	71	73	74	544	43		42	113	116
'96.....	68	84	71	67	68	78	512	46		44	109	91

* Index numbers not included in the general average.

Average Prices of Commodities—Contd.

No. of Article	18	19A*	19B*	19	16—19	1—19	20	21	22	—	23
	Coffee.	Tea.			Sugar, Coffee, and Tea.	Food. Total.	Iron.		Copper.		Tin.
Year.	Mean of 18A and 18B.	Congou, Common. *d.* per lb.	Average Import Price. *d.* and dec. per lb.	Mean of 19A and 19B.	Total.	Total.	Scotch Pig. *s.* and *d.* per ton	Bars, Common. £ per ton	Chili Bars. £ per ton	English Tough Cake. £ per ton	Straits. £ per ton
1882	Prices, see preceding page 18A and 18B.	5	12·58	—	—	—	49·4	6¼	66	71	102
'83		5¾	12·46	—	—	—	46·9	5¾	63	67	93
'84		6¼	11·78	—	—	—	42·1	5⅛	54	59	81
'85		6½	12·06	—	—	—	41·10	4⅞	43	47	87
'86		6½	11·77	—	—	—	39·11	4⅝	40	44	98
1887		5	10·58	—	—	—	42·3	4⅝	44	47	112
'88		4	10·99	—	—	—	39·11	4⅞	81	78	117
'89		4¼	10·79	—	—	—	47·9	6¼	51	54	93
'90		4½	10·65	—	—	—	49·7	6⅜	54	59	94
'91		5½	10·70	—	—	—	47·2	5⅝	51	55	91
1892		4⅞	10·07	—	—	—	41·10	5½	45	48	93
'93		5⅜	9·74	—	—	—	42·4	5	44	47	85
'94		4¼	9·59	—	—	—	42·8	4⅞	40	43	68
'95		4⅛	9·63	—	—	—	44·5	4⅞	43	46	63
'96		4	9·61	—	—	—	46·10	5	47	50	60
Average 1887-96		4⅝	10¼	—	—	—	44½	5¼	50	53	88
'78-87		6¾	12⅝	—	—	—	46	5½	55	60	89
'67-77		11¼	17¼	—	—	—	69	8¼	75	81	105
	Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.										
		*	*								
1882	68	45	73	59	303	1,699	71	76	88	—	97
'83	77	49	72	60	307	1,683	69	70	84	—	89
84	73	56	68	62	253	1,501	61	62	72	—	77
'85	65	58	70	64	250	1,414	60	59	57	—	83
'86	75	58	69	64	239	1,370	58	56	53	—	93
1887	113	44	62	53	269	1,336	61	56	59	—	107
'88	96	36	64	50	259	1,370	58	59	108	—	111
'89	114	38	63	50	300	1,421	69	76	68	—	89
'90	123	40	62	51	282	1,382	72	77	72	—	90
'91	118	49	62	56	285	1,454	68	68	68	—	87
1892	113	43	59	51	278	1,387	61	66	60	—	89
'93	123	48	57	53	299	1,360	61	61	59	—	81
'94	117	38	56	47	260	1,259	62	59	53	—	65
'95	115	37	56	47	247	1,224	64	59	57	—	60
'96	100	36	56	46	236	1,173	68	61	63	—	57

* Index numbers not included in the general average.

Average Prices of Commodities—Contd.

No. of Article	24	25	26	20—26	27	28	29A	29B	30A	30B	31
	Lead.	Coals.			Cotton.		Flax.		Hemp.		Jute.
Year.	English Pig.	Wallsend Hetton in London	Average Export Price.	Minerals. Total.	Middling Uplands.	Fair Dhollerah.	St. Petersburg	Russian, Average Import.	Manila Fair Roping.	St. Petersburg Clean.	Good Medium.
	£ per ton	*s.* per ton	*s.* and dec. per ton		*d.* per lb.	*d.* per lb.	£ per ton	£ per ton	£ per ton	£ per ton	£ per ton
1882.....	14½	17	9·14	—	6 5/8	4 5/16	29½	30½	46	24	15
'83.....	12 7/8	18	9·35	—	5 3/4	3 7/8	30	30½	46	26	14¼
'84.....	11¼	16½	9·29	—	6	3 5/16	29½	30¾	38	29	13¾
'85.....	11 5/8	16½	8·95	—	5 5/8	4¼	34	35	35	29	12
'86.....	13¼	16	8·45	—	5 5/8	3 9/16	35	35	29	29	11½
1887.....	12 7/8	16	8·32	—	5½	3 9/16	32	31½	34	29	12¼
'88.....	13 7/8	16⅓	8·41	—	5 9/16	3 7/8	29	28	37	26	13¼
'89.....	13	17⅛	10·21	—	5 15/16	4 1/8	28	28	50	26	15
'90.....	13¼	19	12·62	—	6	3 15/16	27	26	39	26	13¼
'91.....	12½	19	12·16	—	4 11/16	3¼	28	26	32	24	13
1892.....	10 5/8	18½	11·04	—	4 3/16	3	28	26	28	24	15
'93	9¾	19½	9·90	—	4 5/8	3 9/16	34	31½	26	24	13
'94.....	9 5/8	16½	10·50	—	3 13/16	2 5/8	32	33	22	24	12½
'95.....	10¾	15	9·33	—	3 27/32	2¾	26	28	19	25	11
'96.....	11½	15	8·85	—	4 31/32	3 3/32	26	27	17½	25	12¼
Average 1887-96	12	17¼	10⅛	—	4 7/8	3 3/8	29	28½	30½	25½	13
'78-87	14	16¾	9	—	6	4¼	33	34	35½	26½	15
'67-77	20½	22	12½	—	9	6¾	46	48	43	35	19
	Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.										
1882.....	71	77	73	553	74	64	64		90		79
'83.....	63	82	75	532	64	58	65		92		75
'84.....	55	75	74	476	67	59	64		86		71
'85.....	57	75	72	463	62	63	73		82		63
'86.....	65	73	68	466	57	53	75		74		61
1887.....	63	73	67	486	62	53	68		81		64
'88.....	68	75	67	546	62	58	61		81		70
'89	63	80	82	527	66	61	60		97		79
'90.....	65	86	101	563	67	58	56		82		70
'91.....	61	86	97	535	52	48	57		72		68
1892.....	52	84	88	500	46	45	57		67		79
'93.....	48	89	80	479	51	53	70		64		68
'94	47	75	84	445	42	39	69		59		66
'95.....	52	68	75	435	43	41	57		56		58
'96.....	56	68	71	444	48	46	56		55		64

Average Prices of Commodities—Contd.

No. of Article	32A	32B	33	34	27—34	35A	35B	36	37A	37B	38
	Wool.			Silk.		Hides.		Leather.	Tallow.		Oil.
Year.	Merino, Port Phillip, Average Fleece.	Merino, Adelaide, Average Grease.	English, Lincoln Half Hogs.	Tsatlee.	Textiles. Total.	River Plate, Dry.	River Plate Salted.	Crop Hides, 30–45 lbs.	St. Petersburg, Y.C.	Town.	Palm.
	d. per lb.	*d.* per lb.	*d.* per lb.	*s.* per lb.		*d.* per lb.	*d.* per lb.	*d.* per lb.	*s.* per cwt.	*s.* per cwt.	£ per ton
1882.....	19¾	9	11¼	15¾	—	9	7	15	52	44	35
'83.....	19	8½	10	15⅝	—	9	7	15	50	43	41
'84.....	18¼	8⅛	10	14½	—	9	7	15	47	37½	36
'85.....	16½	6¾	9⅞	12⅝	—	8¾	6½	15	38	30½	30
'86.....	15½	6⅝	10	13¾	—	8	5¾	15	31	26	24
1887.....	15¾	7	10⅝	14½	—	7¾	6¼	15	31	24	22
'88.....	15⅝	7	10⅜	13	—	6¾	4⅞	14	36	28	22
'89.....	17½	8¼	11	13½	—	6¼	5	13½	38	27	25
'90.....	16	7½	11	14	—	5¾	5½	13	38	26	27
'91.....	14¾	6⅞	9¾	13	—	5½	5⅛	13	40	27½	26
1892.....	13	6	8¾	12¼	—	5½	4⅝	13	45	27	24
'93.....	12¾	6	10¼	12½	—	5⅓	4⅞	13	48	30½	28
'94.....	11¾	5⅜	10⅛	10	—	5⅓	4¾	12½	48	25½	24½
'95.....	12	5⅝	12	10	—	7⅛	6¼	13½	48	23	23
'96.....	13	6⅜	11½	10½	—	6¾	5½	13½	48	21	22
Average 1887-96	14¼	6⅝	10½	12¼	—	6¼	5¼	13½	42	26	24½
'78-87	18½	8⅜	11⅜	15	—	8⅜	6¾	15	41	35½	32½
'67-77	21¼	9⅞	19¾	23	—	9	7	16	45	45	39

Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.

1882.....	92	57	68	588	100	94	107	90
'83.....	89	51	68	562	100	94	103	105
'84.....	85	51	63	546	100	94	94	92
'85.....	73	50	55	521	95	94	76	77
'86.....	70	51	60	501	85	94	63	61
1887.....	72	54	63	517	88	94	61	56
'88.....	72	53	57	514	73	87	71	56
'89.....	82	56	59	560	70	84	72	64
'90.....	76	56	61	526	70	81	71	69
'91.....	70	49	57	473	66	81	75	67
1892.....	61	44	53	452	63	81	80	61
'93.....	60	52	54	472	65	81	87	72
'94.....	55	51	43	424	64	78	82	63
'95.....	57	61	43	416	84	84	79	59
'96.....	62	58	46	435	77	84	77	56

Average Prices of Commodities—Contd.

No. of Article	39	40A	40B	41	42	43	44	45A	45B	35—45	20—45	1—45
	Oil.		Seeds.	Petroleum.*	Soda.	Nitrate of Soda.	Indigo.	Timber.		Sundry Materials. Total.	Materials. Total.	Grand Total.
Year.	Olive.	Linseed.	Linseed.	Refined.	Crystals.		Bengal, Good Consuming.	Hewn, Average Import.	Sawn or Split, Average Import.			
	£ per tun	£ per ton	s. per qr.	d. per gall.	s. per ton	s. per cwt.	s. per lb.	s. per load	s. per load			
1882.....	37	23	44	6	63	13¼	6½	52	52	—	—	—
'83.....	36	20	42	6½	66	11¼	6¼	52	48	—	—	—
'84.....	40	20	43	6¼	65	9½	6	48	46	—	—	—
'85.....	39	22	44	6⅞	55	10½	5¼	48	45	—	—	—
'86.....	38	20½	42	5⅞	49	10	5	43	43	—	—	—
1887.....	34	20½	38	5⅝	50	9½	4¾	38	42	—	—	—
'88.....	36	18½	39	6½	48	10	4¾	41	44	—	—	—
'89.....	35	20	42	5¾	51	9½	4½	47	49	—	—	—
'90.....	41	23	43	5½	61	8½	4¼	44	46	—	—	—
'91.....	43	21	42	5⅝	64	8¾	4¾	40	43	—	—	—
1892.....	36	18½	39	5	66	8¾	4½	40	44	—	—	—
'93.....	36	20½	42	4	58	9¼	5½	38	43	—	—	—
'94.....	35	20¼	38	3⅞	42	9¼	5	36	44	—	—	—
'95.....	36	20¼	37	6	39	8¼	4¼	37	42	—	—	—
'96.....	30	17½	33	5½	42	8	4¼	40	45	—	—	—
Average 1887-96	36	20	39½	5⅜	52	9	4⅝	40	44	—	—	—
'78-87	40	23	46	6⅞	62	12½	6	47	47	—	—	—
'67-77	50	30	60	12½*	92	14	7¼	60	54	—	—	—
	Index Numbers (or Percentages) of Prices, the Average of 1867-77 being 100.											
1882.....	74	75	* 48	69	95	90	91	933	2,074	3,773		
'83.....	72	68	52	72	80	86	88	920	2,014	3,697		
'84.....	80	69	52	71	68	83	82	885	1,907	3,408		
'85.....	78	73	55	60	75	72	81	836	1,820	3,234		
'86.....	76	69	47	53	71	69	76	764	1,731	3,101		
1887.....	68	65	45	54	68	66	70	735	1,738	3,074		
'88.....	72	63	52	52	71	66	74	737	1,797	3,167		
'89.....	70	69	46	55	68	62	84	744	1,831	3,252		
'90.....	82	73	45	66	61	59	79	756	1,845	3,227		
'91.....	86	70	45	70	63	66	73	762	1,770	3,224		
1892.....	72	64	40	72	63	62	74	732	1,684	3,071		
'93.....	72	69	32	62	66	76	71	753	1,704	3,064		
'94.....	70	65	31	46	66	69	70	704	1,573	2,832		
'95.....	72	64	48	42	59	59	69	719	1,570	2,794		
'96.....	60	56	44	46	57	59	74	690	1,569	2,742		

* Petroleum as compared with the average from 1873-77 only.

IV.—*Fires in London and the Metropolitan Fire Brigade in* 1896.

The following particulars are taken from the Report of the Chief Officer to the Fire Brigade Committee of the London County Council, in continuation of similar notices for former years:—

"The number of fires in London in 1896 was 3,616; of these 122 were serious and 3,494 slight.

"These cases of fire entailed the turning out of brigade men and appliances for work in extinguishing fires, not including chimney or false alarms.

"The number of fires in which life has been endangered is 155; the number in which a loss of life has occurred is 77; observing that in this calculation a life is said to be endangered when the person alluded to left the house by irregular means.

"The number of persons whose lives were endangered is 261. Of these 155 were saved, the remaining 106 lost their lives.

"*Causes of Fire where Loss of Life occurred.*—Unknown 43, mineral oil lamps 34, children playing with fire 9, seeking for an escape of gas 1, clothing coming in contact with fire 8, intoxication 1, explosion of chemicals 2, spark from fire 4, candle 2, spirit vapour 2.

"*Circumstances with respect to Loss of Life.*—Dead before the firemen arrived 33, taken out before the firemen arrived 57, died after the firemen arrived 11, taken out alive after the firemen arrived 5.

Comparative Table of Lives Lost during the last Ten Years.

	Lives Lost.	Lives Endangered.		Lives Lost.	Lives Endangered.
1887	55	198	1892	64	169
'88	48	178	'93	82	160
'89	44	184	'94	82	204
'90	61	212	'95	91	306
'91	61	268	'96	106	261

"With reference to the above tables it will be seen—

"(1.) That about 32 per cent. of these deaths occurred before the arrival of the brigade.

"(2.) 53 per cent. injured persons, who afterwards died escaped before the arrival of the firemen.

"(3.) 6 per cent. were taken out and assisted to hospital by the firemen.

"(4.) 9 per cent. the firemen were unable to rescue.

"In 1,894 instances the brigade was called for chimneys on fire, of which 625 were false alarms.

"The false alarms received number 973, of which 403 were maliciously given, and resulted in 7 persons being brought to punishment. This number does not include 3 persons who for malicious or other reasons broke the covering glass without giving the alarm,

"There have been 11 cases in which the water arrangements have not been satisfactory, all of which have been duly reported; and although a severe drought occurred this year, no serious results were experienced from short supply of water.

"The strength of the brigade to-day is as follows: 842 firemen, including chief officer, second officer, superintendents, and all ranks; 25 men under instruction, 17 pilots, 76 coachmen, and 3 storekeepers.

"The number of firemen on detail duty is 140 by day and 375 by night.

"The average number available for general work is 652 by day and 388 by night.

"The number of accidents to members of the brigade recorded during 1896 is 110, of which 2 have been fatal.

"There have been during the year 348 cases of ordinary illness, none of which resulted in death.

"The total number of officers and men struck off the strength of the brigade during the year is 75."

The following particulars are obtained from the tables appended to the report, viz.: fires classified according to occupations, and arranged in the order of frequency of occurrence; to which are added, for the purpose of comparison, the corresponding figures for the three previous years:—

Number.	Occupations.	Number of Fires.			
		1896.	1895.	1894.	1893.
1	Private houses	949	1,003	851	817
2	Lodgings	801	726	596	661
3	Victuallers	83	81	82	80
4	Commons, roads, and open spaces	70	62	34	77
5	Unoccupied	56	50	39	62
6	Oil and colourmen	53	46	39	34
7	Builders	48	40	39	44
8	Confectioners and pastrycooks	45	40	46	41
9	Cabinet makers	43	28	20	27
10	Offices	42	36	21	29
11	Tailors, clothiers, and outfitters	39	34	31	61
12	Drapers	39	33	44	33
13	Under repair and building	37	33	27	44
14	Boot and shoe makers	37	48	43	52
15	Greengrocers and fruiterers	35	44	45	45
16	Coffee houses	35	33	31	35
17	Printers and publishers	31	36	29	32
18	Hotels (including club houses)	30	23	14	14
19	Grocers	29	61	54	44
20	Refreshment rooms	29	23	26	29
21	Chandlers	28	24	26	14
22	Hairdressers	28	28	30	26
23	Railways	27	25	15	24
24	Bakers	26	32	22	33
25	Provision merchants	25	23	16	17

Number.	Occupations.	Number of Fires.			
		1896.	1895.	1894.	1893.
26	Tobacconists	24	30	26	28
27	Furniture makers and dealers	24	21	23	25
28	Beershop keepers	24	18	6	13
29	General dealers	23	15	4	—
30	Engineers and machinists	22	12	25	33
31	Chemists	21	13	14	17
32	Fried fish shops	20	22	22	21
33	Fishmongers	20	15	5	20
34	Butchers	18	26	24	18
35	Waggons on the road	18	5	11	7
36	Booksellers, binders, and stationers	15	16	19	24
37	Churches and chapels	15	13	10	12
38	Milliners and dressmakers	15	10	11	11
39	Dairymen	14	19	8	19
40	Coal and coke merchants	14	14	16	9
41	Stables	14	27	16	40
42	Laundries	13	20	24	20
43	Corn dealers	13	20	7	12
44	Wardrobe dealers	13	12	15	21
45	Contractors	13	12	8	14
46	Timber merchants	13	3	2	11
47	China and glass dealers	12	9	13	13
48	Warehouses	11	14	13	13
49	Ironmongers	10	5	8	8
	Remainder	552	650	511	623
		3,616	3,633	3,061	3,410

Fires classified under the causes to which they have been assigned, and arranged in the order of frequency of occurrence:—

Causes.	Number of Fires.
1. Lamps (not gas) and lights thrown down	508
2. Unknown and doubtful	894
3. Gas in various ways	310
4. Sparks from fires, &c.	251
5. Candles	229
6. Defective or improperly set flues, hearths, stoves, &c.	212
7. Children playing with fire, matches, &c.	190
8. Hot ashes	112
9. Airing linen and drying stoves	89
10. Overheating of flues, ovens, furnaces, boilers, &c.	77
11. Boiling over, or upsetting of fat, pitch, &c.	60
12. Foul flues, &c.	54
13. Overheating, &c., of portable gas stoves, &c.	44

Causes.	Number of Fires—*Contd.*
14. Lucifer matches	32
15. Mineral oil stoves, explosion or upsetting of	29
16. Smoking tobacco	18
17. Vapour of spirit in contact with flame	16
18. Spontaneous ignition	16
19. Lime slaking by rain and otherwise	12
20. Burning rubbish	9
21. Clothes or goods coming in contact with fire	7
22. Fumigating	7
23. Electric wires, short circuit of	7
24. Plumbers at work	6
25. Lighted taper	4
26. Spirit stove	4
Miscellaneous varying from 3 to 1	19
Total	3,616

V.—*English Literature in* 1896.

The following particulars are taken from the *Publishers' Circular* of the 2nd January, 1897, in continuation of a series of similar extracts for previous years :—

"The publications of 1896 exceed by some three score those of 1895.

"In new theology, poetry, year-books, the numbers are almost exactly as in the preceding year. In education the number is down as to new books and up as to new editions; while history shows an advance of 200, thus exceeding the figures of 1894 by 300.

"The law books are double those of 1895, but only slightly exceed those of 1894. Works on political economy and commerce increased by 80 in the twelve months just closed, this being 100 more than the total of 1894. Travel, miscellaneous, and belles-lettres have smaller numbers against them.

"In art books there is a large growth, while fiction shows an increase of 100 in new books and of 200 in new editions. The

two departments supplied 6 fresh books for each weekday and 4 for each Sunday in the year.

Analytical Table of Books Published in 1896.

Subjects.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total of Books on each Subject for the Year.	
Theology, sermons, biblical	* 29	33	43	32	46	38	35	22	27	66	65	67	503	
	† 7	7	6	7	10	8	2	5	5	17	9	17	100	
														603
Educational, classical, and philological	* 31	83	62	26	39	43	33	28	35	58	54	37	529	
	† 7	21	12	4	10	13	4	5	5	17	7	9	114	
														643
Juvenile works and tales, novels, tales, and other fiction	* 69	103	129	104	132	104	78	67	123	357	224	164	1,654	
	† 20	44	29	39	35	45	31	37	29	96	62	58	525	
														2,179
Law, jurisprudence, &c.	* 3	15	12	5	5	16	4	10	3	46	4	9	132	
	† 5	4	3	3	4	3	8	6	1	6	3	4	50	
														182
Political and social economy, trade and commerce	* 20	20	25	15	20	22	13	14	13	30	37	18	247	
	† 2	7	7	10	12	6	12	10	10	9	4	10	99	
														346
Arts, science, and illustrated works	* 16	21	35	16	38	23	17	21	16	24	50	38	315	
	† 5	3	2	4	12	11	3	4	1	7	5	8	65	
														380
Voyages, travels, geographical research	* 14	15	13	12	12	10	8	7	7	24	62	7	191	
	† 2	1	4	4	7	1	3	2	—	3	2	3	32	
														223
History, biography, &c.	* 27	52	41	54	58	32	35	21	29	79	74	78	580	
	† 14	7	11	9	9	5	11	8	7	21	19	16	137	
														717
Poetry and the drama	* 14	24	24	35	14	12	13	12	9	39	50	38	284	
	† 4	6	5	4	15	8	17	11	7	20	14	12	123	
														407
Year-books and serials in volumes	* 56	38	20	12	20	16	9	11	22	40	32	37	313	
	† —	—	—	—	—	—	—	—	—	—	—	—	—	
														313
Medicine, surgery, &c.	* 11	5	11	7	10	9	8	6	7	18	14	11	117	
	† 2	5	5	1	2	3	6	5	3	2	5	6	45	
														162
Belles-lettres, essays, monographs, &c.	* 11	15	11	9	11	15	10	6	5	23	8	6	130	
	† 1	—	1	—	—	9	—	1	—	7	3	1	23	
														153
Miscellaneous, including pamphlets, not sermons	* 8	7	20	11	21	26	39	39	6	10	13	39	239	
	† —	—	1	1	4	5	5	3	—	3	1	3	26	
														265
	378	536	532	424	546	483	404	361	370	1,022	821	696		6,573

* New books. † New editions.

"The analytical table is divided into thirteen classes; also new books and new editions.

Divisions.	1895.		1896.	
	New Books.	New Editions.	New Books.	New Editions.
Theology, sermons, biblical, &c.	501	69	503	100
Educational, classical, and philological	660	111	529	114
Novels, tales, and juvenile works	1,544	347	1,654	525
Law, jurisprudence, &c.	57	33	132	50
Political and social economy, trade and commerce	163	23	247	99
Arts, sciences, and illustrated works	96	16	315	65
Voyages, travels, geographical research	263	75	191	32
History, biography, &c.	353	68	580	137
Poetry and the drama	231	16	284	123
Year-books and serials in volumes	311	—	313	—
Medicine, surgery, &c.	153	53	117	45
Belles-lettres, essays, monographs, &c.	400	42	130	23
Miscellaneous, including pamphlets, not sermons	749	182	239	26
	5,581	935	5,234	1,339
	6,516		6,573	

VI.—*Notes on Economical and Statistical Works.*

Judicial Statistics, England and Wales, 1894. Part 2, *Civil Judicial Statistics.* 298 pp., 4to. 3*s.* 9*d.* 1896.

This volume begins a new series of the Civil Judicial Statistics, and the editor, Mr. Macdonell, explains in a careful introduction, the changes which have been made, and also reviews the statistics from the year 1858 to 1894, adding occasionally references to years at the beginning of the century. In accordance with the report of the Departmental Committee appointed by Lord Herschell to consider this matter, efforts will be made in the future to still further improve the returns, so as to make them more complete, more uniform, and to obtain a closer approximation to the returns of other countries.

Naturally, the greater part of the information contained in this volume is of interest to legal rather than lay readers. Nevertheless, no small amount of useful knowledge for laymen is presented by the editor in his summaries of progress, as shown by the figures. The increase and decrease of litigation in different courts, and in gross, is shown by eight diagrams, in which the records of legal proceedings are compared with such social or commercial movements as those of population, marriages, and trade.

In general there has been a decrease of litigation in proportion

to population, exceptions being found in the Chancery Division and Appellate Courts.

In dealing with the Judicial Committee of the Privy Council, Mr. Macdonell finds occasion to point out that the reputed litigiousness of the Hindoos is not borne out by the records of this Court. Colonial cases are a much greater proportion of its business than formerly, and bear a very high ratio to population when contrasted with India. The average annual number of colonial cases in 1890-94 was the same, 33, as in 1814-26. There was a great reduction in West Indian cases, but, excluding these, the colonial cases have doubled. The contrast between colonial and Indian cases is further shown in the proportion of "judgments affirmed." In both cases this is greater than formerly, but stands at about 62 per cent. for India, 50 for the Colonies.

Similarly, for appeals to the House of Lords there is a contrast between Scotland and England. The proportion of English judgments affirmed on appeal is, and has been, greater than in the case of Scotch appeals.

Several modes of argument tend to the conclusion that the number of what Bentham termed *mala fide* appeals is decreasing, and a cognate and equally interesting fact is that there is a greater reality and substance in litigation than formerly, the matters in question are of greater importance, and are pursued with greater earnestness. To this may be added, that there appears to be a tendency to seek a civil remedy for grievances which in former times were responsible for crimes of violence. A graphic presentation of the distribution of cases tried in accordance with the amount recovered at three different epochs, brings out well the increasing substantiality of the actions.

Some information as to the amount of 197 bills of costs in the Queen's Bench Division, shows an average of 81*l.* 9*s.* 3*d.*, of which more than the half was out-of-pocket expenses, and from which an amount averaging 21*l.* –*s.* 3*d.* was taxed off.

Instructive comparisons of our divorce statistics with those of other countries are given, by which it appears that divorces are somewhat rarer here than ten years ago, and that in France they are about fifteen times as numerous relatively to population, in Germany eleven times, and in Belgium six times. A preference for divorce rather than for judicial separation is noted as growing.

The county courts show a considerable increase in business, almost keeping pace with increase of population. The average amount recovered is given as 2*l.* 11*s.* 1*d.* in 1893-94, against 2*l.* 1*s.* 8*d.* in 1858-62. For every 1*l.* recovered in the earlier period the costs were about 10*d.*, the fees about 5*s.*; in 1893-94 the costs were about 1*s.* 10*d.*, the fees about 5*s.* 2*d.*

In the records of bankruptcy the working of the Acts of 1861, 1869, and 1883 are compared. Under the last Act the average amount realised per estate has not changed seriously during the time it has been in operation, but an improvement in the percentage of assets to liabilities has taken place; still more so as compared with the period during which the Act of 1869 was in operation, when the amounts realised per estate were much larger.

In regard to compositions, those under 7*s.* 6*d.* in the pound have practically ceased to exist, those above 10*s.* have more than doubled. A further point of interest is that discharges are refused more often than under the earlier Acts.

Summing the estimated liabilities and assets during the years 1891-94 under Bankruptcy Acts, Deeds of Arrangement Act, and Companies (winding up) Act, the totals on both sides increased largely to 1893, but in 1894 the proportion of assets to liabilities was far smaller than in either of the preceding three years, though the total liabilities were less than the half of those in the year 1893.

In respect to the returns for 1894, attention is drawn to the proportion which the business at four large centres bears to the whole work of the judges on circuit. With the figures for this we may conclude this notice; they are as follow:—

	Number of Actions Entered for Trial.	Number of Actions Tried or otherwise Disposed of.	Total Amounts Recovered.	Commission Days.	Number of Days Judges Sat.
			£		
Birmingham	113	91	9,655	1	27
Manchester.....	195	140	26,316	5	72
Liverpool	144	108	34,541	5	60
Leeds	174	119	14,980	3	38
Total.....	1,125	839	119,550	121	608

For further details and for further information on the whole range of matters included in this report, we must refer our readers to the report itself.

Dictionary of Political Economy. Vol. ii, F—M. Edited by R. H. Inglis Palgrave. 848 pp., 8vo. 21*s.* Macmillan and Co., 1896.

The appearance of the second volume of Mr. Palgrave's Dictionary will be welcome to all who have learnt, by the use of the first volume, to appreciate this important work. To some it will be a matter of regret that the abandonment of the method of publication in small parts has involved so much longer an interval, on the one hand between the appearance of the preceding instalment of the work and the present, and, on the other hand, between the preparation and publication of some of the contributions which go to make up this formidable volume.

The variety of subjects treated precludes any attempt to indicate the contents of the volume in any other way than to state that the first article is entitled "The three F's—Fixity of Tenure, Fair Rent, Free Sale," and the last "Mutuum."

The introduction justly calls attention to the articles on the French, German, and Italian Schools of Economics contained in the present volume, as also to the plates giving reproductions of

Labour Exchange Notes and a Labour Bank Note, which so admirably illustrate the article on Labour Exchange.

It is welcome news that considerable progress has been made with vol. iii.

Industries and Wealth of Nations. By Michael G. Mulhall. 451 pp., 8vo. Longmans, Green, and Co., 1896.

This small volume appears to be, in a sense, an appendix to the same author's well known *Dictionary of Statistics.* It brings together a remarkable amount of information in regard to the various countries of Europe, the United States, Canada, Australia, South Africa, Argentina, and Uruguay. Commerce, finances, shipping, currency, agriculture, manufactures, all find a place, and in regard to each much detail is given, such as, for example, estimates of average earnings and average value of output per hand in different industries, the distribution of expenditure between food and other items in different nations, the relative pressure of taxation in different countries, &c. The most important facts are exhibited in a series of thirty-two diagrams, some of which bring out in a very striking fashion the points to which the numerical estimates in the text refer.

Amid such a mass of material there occur, naturally, statements of varying degrees of authenticity. The introduction explains the basis on which the results have been framed, and those who wish to employ these results would do well to note with care the statements of the author in this regard. In the calculations of the working power of different nations, tables are compiled which, though instructive, must be used with due care, and the comparatively rough approximation which underlies the computations strictly borne in mind. "Human energy, counting only men up to 60, will be found in most countries equivalent to 90 foot-tons daily per head of the whole population;" "each unit of horse-power is considered equal to 4,000 foot-tons daily;" "a safe estimate will be 80 horse-power for every lineal mile of railway or else one horse of steam to every 50 miles run in the year by locomotives," where the number and power of locomotives cannot be ascertained. It is clear that calculations on this basis cannot be pushed too far. We quote, too, the formula on which the annual earnings of a nation are calculated: "Agricultural, 60 per cent. of gross annual product; manufacturing, 50 per cent. of output of mills and artizans; minerals, forestry, fisheries, total annual value produced; commercial, 10 per cent. on aggregate internal trade; transport, 10½ per cent. on same; house rent, 6 per cent. on value of houses; domestic wages, two-thirds of house rent; public service, 50 per cent. of national revenue; professions, 10 per cent. on sum of all preceding." We leave our readers to judge of the conclusions capable of being derived from a comparison of earnings of nations under totally different conditions by this formula.

We hoped, after reading that the proportionate division of the German people between different occupations was assumed in the text to remain in 1895 what it was in 1882, to find in the appendix some reference to the actual results of the 1895 census. Possibly

the volume was already printed before these results were available. Even in that case a reference to probable changes would not have been out of place.

It would be ungracious, however, to pick out here all the small defects which, from the very nature of the case, can hardly be avoided in a volume like this. As a work of reference it will take its place beside its author's dictionary, and, apart from this, a very casual study of its pages will emphasise in a most effective and desirable way the enormous strides in industrial advance which the world has taken during the fifty or sixty years last past.

It should be added that, at the end of the volume, there are placed a series of comparative tables for more handy reference, and also a copious index extending to 17 pages.

Life and Labour of the People in London. Edited by Charles Booth. Vol. viii, 473 pp., crown 8vo. 7*s.* 6*d.* Macmillan and Co., 1896.

The eighth volume of this well known and greatly appreciated work continues the classification of the population by trades, which has occupied several preceding volumes. The subjects dealt with on this occasion are the public service and professional classes, domestic service, the "unoccupied" classes, and inmates of institutions. The usual accounts of the nature of the work, conditions of employment, and wages, with the comparison of earnings with degree of crowding, are given, and, as noted in former volumes, not only do we get knowledge of London conditions, but also explanations of the processes of preparation of things which occupy an important place in the life of the people.

In treating of laundries, an amount of information is given which should materially assist students of this volume to understand the points of dispute in relation to the application of the Factory Acts to laundries. The domestic servant difficulty does not pass unnoticed; and here again help is given to locate more precisely than is commonly done the true source of trouble.

There is an interesting account of the training, work, and earnings of hospital nurses, and, in the tables showing the numbers of persons in the employ of the London School Board at different rates of salary, a useful piece of information on a subject of considerable present interest is placed before the readers of this work. Though possibly not reaching the same high level of attractiveness to the average outsider, who cares comparatively little for the great problem with which Mr. Booth is concerned, this volume falls short by nothing in the value of the information contained, and in the clear presentation of that information, as compared with other volumes of the series.

Under the head of "a picture of pauperism," this volume contains a reprint of several family histories of paupers from the author's former volume, *Pauperism and the Endowment of Old Age.* Besides the usual tables at the end, there is the announcement that vol. ix will contain a summary and comparative analysis of previous volumes, and will deal with the conclusions to be drawn from the whole industrial inquiry.

Étude sur le Commerce International comparé. Par Yves Guyot.

To the January number of the *Journal des Economistes* M. Yves Guyot supplies an extremely instructive article under the above title. In the main it consists of a criticism of protectionist arguments, and, among them, those advanced by the author of *Made in Germany*, in the demolition of many of which M. Guyot avails himself of the assistance of Mr. Medley's *The German Bogey*. We need not repeat here the exposure of a series of errors in statistics and of the crudeness of the methods adopted for comparison. To do so would be to repeat unnecessarily what is readily available to all interested in the question.

M. Guyot then goes on to examine the question of "the balance of trade," and readily shows that the richest countries in the world are, with the exception of the United States, in the list of those whose imports exceed their exports. Further, the excess of imports of merchandise does not stand alone. It is accompanied by a not inconsiderable excess of imports of the precious metals, the United States again standing among the countries with an excess of exports. Facts appear to be conclusive against the theory that the adverse trade balance is liquidated in bullion.

M. Guyot calls attention again to the differences between the records of the same stream of trade by the different countries engaged in it, examples in the trade between Germany, France, and England being supplied. The differences are put down to the account of *entrepôt* trade, but it would appear as if this cannot wholly account for the facts as recorded.

The author then proceeds to point out that the most important markets for the produce of the great commercial nations of the world are to be found, not in far distant lands, but in the countries of their neighbours and rivals, and scoffs somewhat at the complaints made of neglect of some out-of-the-way corner of the globe by merchants who have more important and engrossing business in dealing with their greatest customers. Proceeding then to a comparison of commerce per head of population, a table is given showing that Switzerland tops the list, Belgium comes next, and the United Kingdom third. Then follow Denmark, Germany, France, and the United States. The possession of a great merchant navy, and of colonies whose trade is monopolised, do not appear to be essential conditions of superiority. The effect of commercial treaties in opening freer routes to trade is next commented on, and a comparison of taxation with commerce in different countries follows, showing far lower rates per head for the four countries heading the list referred to above than for France. The moral is, of course, that the increase of national expenditure and the policy of protection are likely to lead, not to commercial superiority, but to ruin.

Quesnay et la Physiocratie. Par Yves Guyot (*Petite Bibliothèque Economique*). lxxix + 99 pp., sm. 8vo. Paris: Guillaumin, 1896.

The Physiocrats. Six Lectures on the French *Economistes* of the Eighteenth Century. By Henry Higgs. 158 pp., sm. 8vo. Macmillan, 1897.

M. Yves Guyot's contribution to Guillaumin's series had been long promised, and was long delayed, as can be easily understood, by the author's strenuous labours in public life. When he once found leisure for the work, so ardent an opponent of heresies in economics and economic policy could not fail to turn the utterances of the school of Quesnay to controversial advantage. He is continually haunted by the socialists and the protectionists of his own time in all his exposition of the men and ideas of the eighteenth century. "The notion of the rights of the individual and rights of property, these two in their connection, dates from Quesnay and the Physiocrats; and contains the whole future of societies." (Introd., p. xvi.) "The natural regimen (*police*) of commerce," says Quesnay (*Despotisme de la Chine*), "consists in the free and boundless competition which procures to each nation the greatest possible number of buyers and sellers, in order to assure to it the most profitable price in its sales and purchases—a new doctrine." "A new doctrine, indeed, adds his editor; "it dates from the Physiocrats." (Introd., p. xxxii.) "Positive laws are, to Quesnay, only the declaration of the laws of nature, the latter being the laws that constitute the natural order or system which is at the root of society. This doctrine was embraced by the Constituent Assembly (in its *Droits de l'homme*), but we find the German socialists of the chair declaring at their congress at Eisenach (1873) that there are no natural laws at all." (Introd., p. xli.) M. Yves Guyot thinks the Physiocrats and the men of 1789 were too sanguine in thinking the natural laws and order were to be very readily discovered, and to be made instantaneously efficacious; but he agrees with them in the main, and vigorously defends the common cause. The selections from Quesnay's works include:—(1.) *Analyse du tableau économique;* (2.) *Maximes générales du gouvernement économique;* (3.) *Le Droit Naturel*, and (4.) part of *Le Despotisme de la Chine.*

These selections will be a useful adjunct to Mr. Higgs' book on the Physiocrats, which, short as it is, contains the best history of these writers yet given in English. Like M. Guyot and Professor Oncken, Mr. Higgs describes them as forming "the first scientific school of political economy" (*cf.* Guyot, p. lxxix.) Mr. Higgs succeeds in bringing out very clearly that they were not simply a body of persons who held certain economic doctrines in common, like the classical English economists who succeeded Adam Smith, but they were also bound by a personal tie in something like a fraternal union, and besides economic doctrines, they had in common a political philosophy and an economic policy. The part played in the preaching of their common political gospel by Quesnay, the elder Mirabeau, and Dupont, to say nothing of the lesser men, is excellently described in this book; and due account is taken of the assistance given by the great Turgot as a benevolent outsider.

Mr. Higgs dates the foundation of the school from the interview of the elder Mirabeau with Quesnay in July, 1757, and the decline if not the fall of it from 1776, the year of the death of Turgot, the publication of the *Wealth of Nations*, and the beginning of

Mirabeau's domestic troubles (p. 58). But it had adherents in the present century, almost within living memory (p. 100).

As to the doctrines themselves, taken singly they may fairly be arraigned as many of them hardly new, and many of them hardly true; but the economic policy which went with them was sorely needed by France in the last century, and we can forgive the "single tax" and the "sterility of manufacture," in view of the free trade and the enlightened agriculture which were equally identified with Physiocracy. Mr. Higgs himself is not the champion but the historian of Physiocracy; and he has written a most compact, and learned, and instructive monograph on an important epoch in economic history.

Statistical and Economical Articles in Recent Periodicals.

UNITED KINGDOM—

Economic Journal. December, 1896—What is Capital?: *Prof. I. Fisher.* Bank Amalgamations: *F. E. Steele.* On changes in Trade-organisations: *H. J. Falk.* An Imperial Customs Union: *J. G. Colmer.* Correlation of Total Pauperism with Proportion of Out-relief. II: *G. U. Yule.* Monetary reform in Russia: *Prof. A. N. Miklashevsky.*

Economic Review. January, 1897—The Agricultural Labourer, Past and Present: *Margaret Phillimore.* The Charity Organisation System of To-day: *C. H. Leppington.* Moral Limitations of State Interference: *E. F. B. Fell.*

UNITED STATES—

American Statistical Association. Publications. Sept.—Dec., 1896—Round Numbers in Wages and Prices: *E. D. Jones.*

Annals of American Academy of Political and Social Science—

January—The first apportionment of Federal Representatives in the United States: *E. J. James.* Crime and the Census: *R. P. Falkner.* Values, positive and relative: *W. G. L. Taylor.*

March—Concentration of Industry and Machinery in the United States: *E. Levasseur.* Silver Free Coinage and the Legal Tender Decisions: *C. G. Tiedeman.* The Quantity Theory: *W. A. Scott.*

Journal of Political Economy. December, 1896—The Shipping Trade between the United States and the United Kingdom: *A. N. Kiær.* Lake Transportation and the Iron-ore Industry: *G. G. Tunell.* The Tariff and the Constitution: *A. P. Winston.* The St. Paul method of assessing Real Estate: *F. R. Clow.*

Political Science Quarterly. December, 1896—A Permanent Census Bureau: *Prof. R. Mayo-Smith.* Agricultural Discontent. II: *C. F. Emerick.* Trade-Union Democracy. II: *S. and Beatrice Webb.* The Law of Annexed Territory: *J. Lowndes.* The Colonial Corporation. III: *Prof. H. L. Osgood.* The Destinies of Democracy: *Prof. F. H. Giddings.*

United States—*Contd.*

Quarterly Journal of Economics. January, 1897—The Old Generation of Economists and the New: *Alfred Marshall.* Currency discussion in Massachusetts in the Eighteenth Century. II: *A. McF. Davis.* A Forerunner of Böhm-Bawerk: *C. W. Mixter.* Social and Economic Legislation of the States in 1896: *W. B. Shaw.* The Agricultural changes of the Fifteenth Century: *F. G. Davenport.*

Yale Review. February, 1897—The Tax Inquisitor System in Ohio: *E. A. Angell.* Half a Century of Improved Housing effort by the New York Society for Improving the Condition of the Poor. II: *W. H. Tolman.* The Currency of China: *W. Fisher.* The Day Labor and Contract System on Municipal Works: *J. R. Commons.*

France—

Annales de l'École Libre des Sciences Politiques. January, 1897—Les Roumains de la Turquie d'Europe: *A. G.*

Journal des Economistes—

December—Le Mécanisme naturel de la Production et de la Distribution des Richesses: *G. de Molinari.* Les Census des États d'Amérique: *A. Viallate.*

January—Le marché financier en 1896: *A. Raffalovich.* Étude sur le commerce international comparé: *Y. Guyot.* La Répartition de la richesse en France: *M. Rouxel.*

February—La production des Compagnies françaises et américaines d'assurances sur la vie: *E. Rochetin.* Comment périt une marine marchande: *D. Bellet.* Le mouvement agricole: *L. de Tourville.* L'Emigration: *G. François.*

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Journal de la Société de Statistique de Paris, 1897—

January—L'Ouvrier américain: *E. Levasseur.* De l'influence du developpement de la population sur la représentation parlementaire en Angleterre: *P. Meuriot.* Le Problème monétaire: *F. de Flaix* (*continued in March*).

February—Une table de natalité: *E. Levasseur.* État général et comparatif du régime fiscal de la France: *L. Salefranque.*

March—Le prix de revient et de vente du blé: *F. Bernard.* Le coût de la vie à Paris à diverses époques: *G. Bienaymé* (*concluded*).

La Réforme Sociale. Nos.—

21—Les Écoles ménagères en Belgique: *E. Rombaut.* La Monographie d'Atelier: *E. Cheysson.* L'Étatisme en fait d'alcool. La Question du Monopole: *E. Rostand* (*continued in Nos.* 22 *and* 23).

22—La Monographie de Commune: *E. Cheysson.* L'Enseignement social à l'école primaire: *A. Delaire.*

23—Le droit civil sous la féodalité: *H. Beaune.* Le mineur du Harz cinquante ans après Le Play: *E. Julhiet.*

FRANCE—*Contd.*

La Réforme Sociale. Nos.—Contd.

24—Sociologie et sociologues: *H. Joly.* Les voyages de Montesquieu: *F. de Flaix.* Le Patronage à l'exposition de Lyon: *A. Isaac* (*continued in Nos.* 25 *and* 26).

25—L'enseignement social à Notre-Dame et la méthode de F. le Play: *A. Mascarel.* La notion scientifique du bonheur et son importance sociale: *A. des Cilleuls.* Les questions sociales et les discours de rentrée de 1896: *H. Clément.*

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27—Pourquoi la criminalité monte en France et baisse en Angleterre?: *E. Rostand* (*to be continued*). La Chine dans ses rapports actuels avec l'Europe: *Dujardin-Beaumetz.* La réforme des droits de succession et ses conséquences sociales: *A. Simonin.*

Revue d'Economie Politique—

December—Vues et aspirations économiques en Russie: *V. de Sviatloswricadet.* Le logement du pauvre à Londres: *E. Dixon.* Le mouvement social évangélique en Allemagne: *L. Dechesne.*

January—Pourquoi n'y a-t-il pas de Hobereaux (Junker) en vieille Bavière?: *L. Brentano.* Le mouvement ouvrier en Australasie: *A. Bertram.* Les Instruments monographiques d'observation: *P. du Maroussem.*

February—L'inspection de l'industrie en Autriche: *L. Dechesne.* L'Histoire du Trade-Unionisme: *E. Mahaim.* La loi sur l'assistance médicale gratuite: *A. D. Bancel.* La monnaie et la mesure de valeurs: *M. Mongin.*

GERMANY—

Archiv für Soziale Gesetzgebung und Statistik—

Band 9, *Heft* 3 *und* 4, 1896—Die geplante Reform der deutschen Arbeiterversicherung: *W. Kulemann.* Die Lage der deutschen Handelsgehilfen und ihre gesetzliche Reform: *J. Silbermann.* Das Sweating-System in England: *A. Smith.* Zur Frage der Unfall- und Krankenversicherung in der Schweiz: *Dr. F. Schuler.* Der Normalarbeitstag und die englischen Gewerkschaften: *S. und Beatrice Webb.*

Band 10, *Heft* 1, 1897—Ideale der Sozialpolitik: *Dr. W. Sombart.* Die Konsumvereine und die neueste deutsche Wirtschaftspolitik: *Dr. K. Thiess.* Die Stellung der britischen Gewerkvereine gegenüber der Einführung neuer Arbeitsmethoden: *S. und Beatrice Webb.* Die Arbeitslosenversicherung in St. Gallen: *T. Curti.*

Band 10, *Heft* 2, 1897—Hafenarbeiter und Seeleute in Hamburg vor dem Strike 1896-97: *Dr. F. Tönnies.* Die Heimarbeit und ihre geplante Regelung in Oesterreich: *Dr. S. Bauer.* Wortlaut des Erlasses des österreichischen Handelsministeriums zur Regelung der Heimarbeit. Die Hauptergebnisse der deutschen Berufszählung vom 14 Juni, 1895: *Prof. E. Mischler.* Die Thätigkeit der Arbeitsabteilung (Labour Department) im englischen Handelsministerium: *A. L. Bowley.*

GERMANY—*Contd.*

Jahrbuch für Gesetzgebung, Verwaltung, &c., Heft 1, 1897—Die sociale Entwicklung der führenden Völker Europas in der neueren und neuesten Zeit: *K. Breysig* (*continued from last number*). Die Genueser Seidenindustrie im 15 und 16 Jahrhundert. Ein Beitrag zur Geschichte des Verlagssystems: *H. Sieveking.* Studien zur österreichischen Agrargeschichte und Agrarpolitik: *K. Grünberg.* Ansiedelungskommission und Generalkommission. Ein Beitrag zur inneren Kolonisation des Ostens: *P. Waldhecker.* Eine Studie über Charles Booth's Werk "Life and Labour of the People in London": *S. Heckscher.* Hausindustrielle Gesetzgebung und Sweatingsystem in der Konfektionsindustrie: *A. Weber.*

Jahrbücher für Nationalökonomie und Statistik—

December—Guts- und Leibeigentum in Lippe seit Ausgang des Mittelalters: *W. Meyer.* Eine Erwiderung: *F. Y. Edgeworth.* Bericht von Miss Collet über gewerbliche Frauenarbeit: *Gertrud Dyhrenfurth.* Geschäftsergebnisse der deutschen landwirtschaftlichen Genossenschaften: *K. Thiess.*

January—Zum Entwurf eines Handelsgesetzbuches von 1896: *Dr. Lastig.* Die schweizerische Bundesbank: *H. Hartung.* Russlands Zuckerfabrikation und Rübenbau: *L. Brokl.* Ungarns Finanzlage seit dem 1867er Ausgleiche: *K. Mandello.*

February—Die Statistik in der alten Geschichte: *O. Seeck.* Der Preis als selbständige Kategorie: *O. von Gömöry.* Die Gehälter der Universitätsprofessoren und die Vorlesungshonorare unter Berücksichtigung der in Aussicht genommenen Reformen in Preussen und Oesterreich: *L. Elster.* Der Bankzins als Regulator der Warenpreise: *K. Wicksell.* Statistische Untersuchungen über die Sterblichkeit der Säuglinge an Magen-Darmerkrankungen, unter besonderer Berücksichtigung des Einflusses der Wohlhabenheit der Eltern: *F. und P. Kermauner.* Die gewerblichen Arbeitseinstellungen in Oesterreich, 1895: *V. Mataja.* Indexnummern Hamburger Import-Artikel: *F. Landau.*

Vierteljahrshefte zur Statistik des Deutschen Reichs, 1897. *Heft* 1—Die Arbeiten des Kaiserlichen Statistischen Amts. Zur Statistik der Preise (*Miscellaneous*). Die Bevölkerung nach der Volkszählung vom 2 Dezember, 1895. Die Eheschliessungen, Geburten und Sterbefälle im Jahre 1895. Die überseeische Auswanderung im Jahre 1896. Die Hausirgewerbetreibenden am 14 Juni, 1895. Der Taback im deutschen Zollgebiet. Besteuerung des Tabacks, Ein- und Ausfuhr, 1895-96. Bestand der deutschen Kauffahrteischiffe am 1 Januar, 1896, und die Bestandsveränderungen im Jahre 1895. Verunglückungen deutscher Seeschiffe in den Jahren 1894 und 1895.

Vierteljahrsschrift für Staats- und Volkswirtschaft, &c. Band 5, *Heft* 4, 1897—Die Gewerbeordnungs-Novelle vom 6 August, 1896: *W. Kulemann.* Beitrag zur Geschichte des Sozialismus und des Kommunismus. Mores Utopien und Campanellas Sonnenstaat: *Dr. H. Dietzel.* Die Lohnfrage unter dem englischen Submissionswesen: *Dr. L. Katzenstein.*

AUSTRIA—

Statistische Monatschrift, 1896—

October Heft—Production, Ausschank alkoholhältiger Getränke und die Trunkenheitsgesetzgebung in Oesterreich: *Dr. F. C. Presl.* Die österreichischen Assecuranz-Gesellschaften im Jahre 1894: *Krickl (continued in next number).*

November—December Heft—Die Beziehungen des Altersaufbaues der weiblichen Bevölkerung zur Geburtenhäufigkeit: *Dr. S. Rosenfeld.* Bericht über die Thätigkeit des statistischen Seminars 1895-96.

ITALY—

Giornale degli Economisti—

December—Calcolo della vita media: *L. Rameri.* Lo sviluppo della rete ferroviaria degli Stati Uniti e le sue variazioni: *L. Barberis (continued in January and February).* Di alcuni punti oscuri della demografia: *R. Benini.* Industria armentizia e imposte: *F. Colletti.*

January—Beneficenza e terre incolte: *C. Marucchi.* Aggiunta allo studio sulla curva delle entrate: *V. Pareto.* Suicidi e fallimenti. Note intorno alle ricerca delle cause nella statistica morale: *E. Fornasari di Verce.*

February—Della base economica della storia: *A. Contento.* Il risparmio in Italia nel decennio 1884-93: *C. Bottoni.*

March—Di alcune curve descritte da fenomeni economici aventi relazione colla curva del reddito o con quella del patrimonio: *R. Benini.* La curva delle entrate e la curva di probabilità: *F. Y. Edgeworth.* Ultima risposta al Prof. Edgeworth: *V. Pareto.*

SWITZERLAND—

Journal de Statistique Suisse. 3 *Quartal-Heft.* 1896—Was lehrt uns die Moralstatistik?: *Dr. O. Kirn.* Étude statistique de la hernie d'après différents documents français, suisses, allemands et italiens: *Dr. J. Bertillon.* Der Trunk als Ursache von Vergehen und Verbrechen: *H. Marthaler.* Der berühmte Statistiker Adolf Quételet, sein Leben und sein Wirken: *Dr. N. Reichesberg.* Die Brotpreise, 1895-96: *C. Zuppinger.* Vermögensverhältnisse in Stadt und Landschaft Freiburg im Jahre 1445: *F. Buomberger.*

VII.—*Quarterly List of Additions to the Library.*

Additions to the Library during the Quarter ended 15th March, 1897, *arranged alphabetically under the following heads:*—(a) *Foreign Countries;* (b) *India and Colonial Possessions;* (c) *United Kingdom and its Divisions;* (d) *Authors, &c.;* (e) *Societies, &c.* (*British*); (f) *Periodicals, &c.* (*British*).

Donations.	By whom Presented (when not purchased).
(a) Foreign Countries.	
Argentine Republic—	
Anuario de la Direccion General de Estadistica correspondiente á 1895. 2 vols., 8vo.	The Director-General of Statistics
Comercio Exterior Argentino. Año 1896. No. 91. Importacion y Exportacion de los primeros nueve meses de 1895 y 1896. 8vo.	
Higiene. Anales del Departamento Nacional de. (Current numbers)	The Department
Buenos Ayres (*City*). Monthly Return of Municipal Statistics. (Current numbers)	The Municipal Statistical Bureau
Austria-Hungary—	
Ackerbau-Ministeriums. Statistisches Jahrbuch für 1895. Heft 2. Der Bergwerksbetrieb Österreichs im Jahre 1895. Lief 1. (Bergwerks-Production)	The Ministry of Agriculture
Ernteergebniss der wichtigsten Körnerfrüchte im Jahre 1896. Diagrams, 8vo.	
Arbeitseinstellungen und Aussperrungen im Gewerbebetriebe in Österreich während 1895. 8vo.	The Statistical Department, Ministry of Commerce
"Austria." Archiv für Gesetzgebung und Statistik auf den Gebieten der Gewerbe, des Handels und der Schiffahrt. (Current numbers.) 8vo.	
Ausweis über die monatl. Durchschnittspreise von Weizen, Korn, Gerste, Hafer, und Mais in Marktorten. (Current numbers.) Sheets	The Central Statistical Commission
Consulats-Behörden. Jahresberichte der k. und k. österr.-ungar. (Current numbers.) 8vo.	The Statistical Department, Ministry of Commerce
Handel. Statistische Übersichten betreffend den auswärtigen, des österr.-ungar. Zollgebiets. (Current monthly numbers)	
Statistische Monatschrift. (Current numbers)	Central Stat. Com.
Hungary—	
Ungarisches Statistisches Jahrbuch. Neue Folge, III, 1895. 8vo.	The Royal Hungarian Statistical Bureau
The Millennium of Hungary and its People. Edited by Dr. Joseph de Jekelfalussy. 8vo. 1897	
Brünn. Statistischer Wochenbericht . . . der Landeshauptstadt Brünn. (Current weekly numbers)	The Burgomaster
Prague—	
Bulletins hebdomadaires et trimestriels de la ville et communes-faubourgs. (Current numbers)	The Municipal Statistical Bureau
Statistische Commission, Die, der K. Hauptstadt Prag sammt Vororten und das Prager Städtische Statistische Bureau von 1870 bis 1895. Bericht zum Gedächtnisse ihres 25 Jährigen Bestandes. 8vo. 1895	
Wohnverhältnisse in der K. Hauptstadt Prag . . . nach den Ergebnissen der Volkszählung, 31 Dec., 1890. 8vo., diagrams. 1895	

Donations—Contd.

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(a) **Foreign Countries**—*Contd.*	
Belgium—	
Commerce spécial avec les pays étrangers en ce qui concerne les principales marchandises. Bulletin mensuel du. (Current numbers.) 4to.	The Bureau of General Statistics
Mines de Belgique. Annales des, Année 1897. Tome ii, livraison 1. Plates, 8vo.	The Administration of Mines
Travail. Revue du Travail publiée par l'Office du. (Current monthly numbers.) 8vo.	The Belgian Labour Department
Travail du Dimanche. Vol. ii. Belgique. Établissements industriels (non compris les mines, minières, et carrières). Monographies. 8vo. 1897	
Brussels—	
Bulletins hebdomadaires et trimestriels de statistique démographique et sanitaire. (Current numbers)	Dr. E. Janssens
Rapport sur les opérations de la division d'hygiène et sur la salubrité publique de la Ville pendant 1895. Diagrams, 8vo.	
Bulgaria—	
Commerce de la Principauté avec les Pays étrangers. Statistique du. Mouvement de la navigation et prix moyens annuels pendant 1895. 4to.	The Statistical Bureau
Mouvement commercial avec les pays étrangers. Mouvement de la navigation par ports. Prix moyens dans les principales villes. (Current monthly numbers.) La. 8vo	
China—	
Customs Gazette. July—Sept., 1897. 4to.	Sir Robert Hart, Bart., G.C.M.G.
Denmark—	
Causes des décès dans les villes du royaume en 1895	The Statistical Bureau
Exploitations agricoles du Danemark par dépendances en Hartkorn, 1st Jan., 1895. 4to.	
Mariages, naissances, et décès, 1890-94. 4to.	
Copenhagen. Tableaux statistiques (V, 1891-95) sur Copenhague et Frederiksberg. 8vo. 1896	The Municipal Statistical Bureau
Nationalökonomisk Tidskrift, 1897. (Current numbers)	The Danish Political Economy Society
Egypt—	
Commerce extérieur. Bulletin mensuel du. (Current numbers)	The Director-General of Customs
Budget du gouvernement égyptien pour l'Exercice 1897. La fol. 1896	Sir Elwin M. Palmer, K.C.M.G.
Finances, Comité des. Note sur le projet de Budget pour l'Exercice 1897. Fol.	
Postal Guide, Egyptian. No. 17, Nov., 1896. 8vo.	The Post Office
Sanitaires, &c. Bulletin hebdomadaire de l'Administration des Services. (Current numbers)	The Health Department
Bulletin de l'Institut Egyptien. (Current numbers)	The Institute

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(a) **Foreign Countries**—*Contd.*	
France—	
Agriculture. Bulletin du Ministère de l'. Année 1896. (Current numbers; No. 6 containing "Statistique agricole annuelle, 1895")	The Ministry of Agriculture
Commerce de la France. Documents Statistiques. (Current monthly numbers)	Purchased
Finances, Ministère des. Bulletin de Statistique et de Législation comparée. (Current monthly numbers)	The Ministry of Finance
Hygiène publique de France. Recueil des travaux du comité consultatif d'. Année 1892 Plans, 8vo.	The Registrar-General of England
Minérale. Statistique de l'Industrie, et des Appareils à vapeur en France et en Algérie pour 1895, avec un Appendice concernant la Statistique minérale internationale. Diagrams, 4to.	The Ministry of Public Works
Statistique Pénitentiaire pour 1893. Exposé général de la situation des services et des divers établissements. 8vo	The Ministry of the Interior
Travail. Bulletin de l'Office du. (Current monthly numbers.) 8vo.	The French Labour Department
Paris. Annuaire Statistique de la ville de Paris, XV^e année, 1894. Diagrams, la 8vo.	Dr. J. Bertillon
Économiste Français. (Current weekly numbers)	The Editor
Journal des Économistes. (Current monthly numbers)	,,
Monde Économique. (Current weekly numbers)	,,
Polybiblion. Revue Bibliographique Universelle. Parties Littéraire et Technique. (Current monthly numbers)	,,
Réforme Sociale. (Current numbers)	,,
Rentier. Journal Financier Politique. (Current numbers)	,,
Revue d'Économie Politique. (Current monthly numbers)	,,
Revue Géographique internationale. (Current numbers)	,,
École Libre des Sciences Politiques. Annales. (Current numbers)	The Institution
Musée Social. Circulaires. (Current numbers.) 4to.	,,
Société de Statistique de Paris. Journal. (Current monthly numbers)	The Society
Germany—	
Berufs- und Gewerbezählung, 1895. Berufsstatistik für das Reich im Ganzen. Theil 1. 4to.	The Imperial Statistical Bureau
Beschäftigungslosen Arbeitnehmer im Deutschen Reich am 14 Juni und 2 Dezember, 1895. (Ergänzung zum Heft 4 der "Vierteljahrshefte zur Statistik des Deutschen Reichs.") 4to. 1896.	
Binnen-Schiffahrt im Jahre 1895. 4to.	
Gesundheitsamtes. Veröffentlichungen des Kaiserlichen, Nos. 27—53. 8vo. 1896	The Imperial Health Bureau
Handel des deutschen Zollgebiets. Monatliche Nachweise über den Auswärtigen. (Current numbers)	The Imperial Statistical Bureau
Seeschiffahrt. Statistik der, für 1895. Abth. 1 und 2.	
Vierteljahrshefte zur Statistik des Deutschen Reichs. Jahrgang 1897. Heft 1, 4to.	

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(a) Foreign Countries—*Contd.*	
Germany—*Contd.*	
Uebersicht des Waaren-Ausganges und der erhobenen Ausgangs-Zölle in sämmtlichen Staaten des Zollvereins für 1864. 1 vol. 4to.	Mr. R. F. Crawford
Uebersicht des Waaren-Einganges und der erhobenen Eingangs-Zölle . . . für 1864 und 1871. 2 vols. 4to.	
Prussia—	
Brände im preussischen Staate. Statistik der, für 1888-90. Theil 1. Fol.	The Royal Prussian Statistical Bureau
Ernteertrages für 1895. Ergebnisse der Ermittelung des. Fol.	
Heilanstalten, Die, im preussischen Staate während 1892-94. Fol.	
Landesuniversitäten. Statistik der preussischen, für 1892-93—1894-95. Fol.	
Saxony. Zeitschrift des k. sächsischen statistischen Bureaus. Jahrgang 1896. Hefte 3 und 4. 4to.	The Statistical Bureau of Saxony
Berlin—	
Eheschliessungen, Geburten, Sterbefälle, und Witterung. (Current weekly and monthly numbers)	The Municipal Statistical Bureau
Statistisches Jahrbuch der Stadt Berlin. 1894. 8vo.	
Tabellen über die Bewegung der Bevölkerung der Stadt Berlin im Jahre 1895. La. 4to.	
Dresden—	
Mitteilungen des Statistischen Amtes der Stadt. Heft 6. 1896	,,
Monatsberichte des Statistischen Amtes der Stadt. (Current numbers)	
Frankfort—	
Civilstand. Tabellarische Uebersichten betreffend den, der Stadt im Jahre 1891-95. 5 parts. 8vo.	,,
Jahresbericht ueber die Verwaltung des Medicinalwesens, die Kranken- Anstalten und die oeffentlichen Gesundheitsverhaeltnisse der Stadt. Jahrgang 1895. 8vo.	
Mittheilungen aus der Handelskammer. (Current numbers)	The Chamber of Commerce
Hanover. Monatsberichte des Statistischen Amtes der Stadt. (Current numbers)	The Municipal Statistical Bureau
Strassburg. Beiträge zur Statistik der Stadt. Heft 1. Erhebungen über die Arbeitslosigkeit, 1895. La. 8vo.	,,
Stuttgart—	
Bericht über die Verwaltung und Stand der Gemeinde- Angelegenheiten in 1892-95. Plates, fol.	,,
Statistische Monatsberichte. Nos. 1—10. 1896	
Archiv für Soziale Gesetzgebung und Statistik. Band x, Hefte 1 und 2. 1897	The Publisher
Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft im Deutschen Reich. Heft 1. 1897	The Editor
Jahrbücher für Nationalökonomie und Statistik. (Current monthly numbers)	The Publisher
Vierteljahrsschrift für Staats- und Volkswirtschaft, &c. Band v, Heft 4. 8vo. 1897	The Editor

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Greece—	
Bulletin mensuel du Commerce spécial avec les pays étrangers. (Current numbers) Statistique des fabriques de poudre (de chasse et de mines), de dynamite et de cartouches en Grèce. 8vo. 1896	The Statistical Bureau
Italy—	
Agricoltura. Notizie e studi sull'. Attività degli Istituti enologici dalla loro fondazione a tutto il 1894 Annali di Statistica. Atti della Commissione per la Statistica giudiziaria civile e penale. Sessione de 1896. 8vo. Bilanci comunali. Tariffe daziarie dei comuni chiusi, situazioni patrimoniali dei comuni e debiti comunali e provinciali per 1895. 8vo. Bollettino di Legislazione e Statistica Doganale e Commerciale. (Current monthly numbers) Bollettino Sanitario, Direzione dell' Amministrazione Civile. (Current monthly numbers) Cassa di previdenza per le pensioni civili e militari. Relazione della Commissione reale sulla istituzione di una. Diagrams, 4to. 1894 Commercio speciale di Importazione e di Esportazione. Statistica del. (Current monthly numbers) Elettorale, Statistica, Composizione del corpo elettorale politico ed amministrativo e statistica delle elezioni generali amministrative nell' anno 1895. 8vo. Istruzione superiore. Statistica dell, anni scolastici 1893-94 e 1894-95. 8vo. Tabella indicante i valori delle Merci nell' anno 1896, per le statistiche commerciali. 8vo.	The Director-General of Statistics
L'Economista. (Current weekly numbers)	The Editor
Giornale degli Economisti. (Current monthly numbers)	„
Mexico—	
Amonedaciones e Introducciones de Metales Preciosos a las Casas de Moneda. Año fiscal de 1893-94. Fol. Estadistica fiscal. Datos relativos al año fiscal de 1894-95; y al segundo semestre de 1895-96. (Also current monthly numbers.) Fol. Estadistica fiscal. Movimiento de transportes maritimos y terrestres. Año fiscal 1893-94. Fol.	The Statistical Bureau
Netherlands—	
Alphabetisch Register op de acht Jaargangen (1885-92) der Bijdragen van het Statistisch Instituut. 90 pp., 8vo. 1896	The Institute
Bijdragen tot de Statistiek van Nederland. 4. Onderzoek naar de geschiedenis en werkzaamheid der Vakvereenigingen. 4to. 1896	The Central Statistical Commission
Geboorten. Statistiek der, en der sterfte naar den leeftijd en de oorzaken van den dood. (Current monthly numbers)	The Department of the Interior

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Scheepvaart. Statistiek der, 1895. Gedeelte 3. Map, 4to.	Dr. G. de Bosch Kemper
Staten van de In-, Uit-, en Doorgevoerde voornaamste Handelsartikelen. (Current monthly numbers)	The Central Statistical Commission
Norway—	
Assistance publique. Statistique pour 1893. (251)	The Central Statistical Bureau
Commerce. Statistique du, pendant 1895. (213)	
Electorale. Statistique, année 1894. (245)	
Finances de l'Etat, exercices 1890-95. (249)	
Pêches maritimes pendant 1895. (250)	
Postale. Statistique, année 1895. (247)	
Prisons départementales. Statistique des, 1894. (246)	
Propriétés foncières rurales, 1891. (244)	
Service vétérinaire et inspection de la viande. Compte-rendu pour 1894. (248)	
Christiania. Statistiske Meddelelser angaænde Christiania By, for 1895. 10de Aargang. 8vo.	The Municipal Statistical Bureau
Roumania—	
Buletinul Lunar al Miscarei Populatiunei in Orasele Romaniei. (Current monthly numbers)	The Statistical Bureau
Statistica agricola. (Evaluations provisoires des cultures et récoltes pour 1895-96.) Sheet	
Russia—	
Budget de l'Empire pour l'Exercice 1897. Rapport du Ministre des Finances à S.M. l'Empereur. 4to.	The Ministry of Finance
Budget de l'Empire. Règlement définitif du, pour l'Exercice 1895. Rapport par le Contrôleur de l'Empire. 8vo.	The Controller of the Empire
Bulletin russe de statistique financière et de législation. (Current monthly numbers.) La. 8vo.	The Publishers
Prices. Diagram-maps showing prices of rye and oats in European Russia. (Current monthly numbers.) Sheets	The Department of Commerce and Industry
Trade. Annual Returns for 1894. Maps and diagrams. (Also current monthly returns). [In Russian]	The Customs Department
Finland—	
Befolknings-Statistik, 1894. La. 8vo.	The Central Statistical Bureau
Industri-Statistik, 1894. La. 8vo.	
Moscow—	
Décès à Moscou en 1893. La. 8vo.	The Registrar-General of England
Enquête sur les entreprises de transport par rues dans la ville de Moscou. La. 8vo. 1895	
Servia—	
Statistique de la Justice criminelle pendant 1888-90. Diagrams, 4to.	The Statistical Bureau
Spain—	
Comercio Exterior. Resumenes mensuales de la Estadistica del. (Current numbers)	The Director-General of Customs
Coruña. Provincia de la. Memoria de Valoraciones para el año 1893. 8vo.	

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Guipuzcoa. Provincia de. Memoria de valoraciones para el año 1893 . . . de la Aduana de Irun. 8vo.	The Director-General of Customs
Sociedad Geográfica de Madrid—	
Boletin. (Current monthly numbers)	The Society
Revista de Geografia colonial y mercantil publicada por la Seccion de Geografia comercial. Actas 1897. Nos. 1 and 2. 8vo.	
Sweden—	
Bidrag till Sveriges Officiela Statistik. (G) Fångvården, 1895. (Prisons, &c.)	The Central Statistical Bureau
Switzerland—	
Bulletin démographique et sanitaire suisse. (Current weekly numbers)	The Federal Statistical Bureau
Commerce spécial de la Suisse en 1896. Tableau provisoire. La 4to.	The Federal Department of Customs
Commerce de la Suisse. Statistique du. Tableau comparatif des années 1885-95. La. 4to.	
Incendies. Resultats de la Statistique suisse des, en 1893 et 1894. 4to.	The Federal Statistical Bureau
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Astronomical, magnetic, and meteorological observations made during 1890 at the U.S. Naval Observatory. 4to. 1895	The Observatory
Census, 1890—	
Report on Crime, Pauperism, and Benevolence. Part 1. Analysis. 4to.	The Hon. George F. Hoar
Report on Farms and Homes; proprietorship and indebtedness. Diagrams, 4to.	
Report on Insurance Business. Part 2. Life Insurance. 4to.	
Cholera Epidemic of 1873 in the United States. Plans, &c. 8vo. 1875	The Registrar-General of England
Comptroller of the Currency. Annual Report of, Dec., 1896. Vol. i. 8vo.	The Comptroller of the Currency
Consular Reports. (Current monthly numbers.) 8vo.	Department of State
Deaf. International Reports of Schools for the, made to the Volta Bureau, Dec., 1895. Circular of Information, No. 3. 8vo. 1896	The Volta Bureau
Education. Report of Commissioner of, for the year 1894-95. 2 vols. 8vo.	The Commissioner
Debt. Monthly Statements of the Public, and of Cash in Treasury. (Current numbers.) Sheets.	The Secretary of the Treasury
Gold, Silver, and Notes, &c., in Circulation, and Changes in Money and Bullion in the Treasury. Monthly Statements. (Current numbers.) Sheets.	
Finances. Annual Report of Secretary of Treasury on state of, for year ending 30th June, 1894 (full report), also preliminary report for 1895-96. 2 vols.	
Finance and Commerce. Monthly Summary of. (Current numbers.) 4to.	The Treasury Bureau of Statistics

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Index-Catalogue of Library of Surgeon-General's Office, United States Army. Authors and Subjects. Second Series. Vol i, a-azzurri. La. 8vo. 1896....	The Surgeon-General
Labor. Bulletin of the Department of. (Current numbers)	The Commissioner of Labor
Labor. Tenth Annual Report of the Commissioner of, 1894. Strikes and Lockouts. 2 vols. 8vo.	
Statistical Abstract of the United States, 1896. 19th No. Diagram.....	The Treasury Bureau of Statistics
Surgeon-General of the Army. Report of, for year ending 30th June, 1896. 8vo.	The Surgeon-General
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State Board of Health. Monthly Bulletins. (Current numbers)	The Board of Health
Bureau of Labor Statistics. 12th Annual Report for 1896. Diagram, 8vo.	The Bureau
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Bureau of Statistics of Labor. 26th Annual Report, March, 1896. 8vo.	"
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Births, Marriages, and Deaths. 28th Annual Report on, for 1894. Diagram, 8vo.	The Division of Vital Statistics, Dept. of State
Census of 1894. Vols. i, Population, Births, Marriages, and Deaths, and Churches and Libraries; ii, Agriculture, Manufactories, Mines, and Fisheries; iii, Soldiers, Sailors, Marines. 8vo....	
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Annual Reports of the Metropolitan Board of Health for 1866-69. 4 vols. Plates, 8vo.	The Registrar-General of England
Public Library. Bulletin. Vol. i, Nos. 1, 2. 1897....	The Library
Banker's Magazine and Rhodes' Journal of Banking. (Current monthly numbers)	The Editor
Bradstreet's Journal. (Current weekly numbers).....	"
Commercial and Financial Chronicle. (Current weekly numbers, with Supplements).....	"
Dun's Review. Nos. 179 and 180 (containing Commercial Failures in United States and Canada in 1896)	Messrs. R. G. Dun and Co.
Engineering and Mining Journal. (Current numbers) ...	The Editor
Journal of Political Economy. Vol. v, No. 1, 1896	The Publisher
Library of Economics and Politics. Vol. xii. Essay on the present distribution of Wealth in the United States: *Charles B. Spahr.* 8vo. 1896	The Editor, Dr. R. T. Ely
Political Science Quarterly. Vol. xi, No. 4, 1896	The Editor
Quarterly Journal of Economics. Vol. xi, No. 2, 1897	The Publisher
Sound Currency. Vol. iv, Nos. 1–4, 1897. 8vo. Also Present Problems. Vol. i, No. 13. Wages *vs.* 16 to 1. 1897	The Reform Club, New York
Studies in History, Economics, &c. Vol. vii, No. 2. Speculation on the Stock and Produce Exchanges of the United States: *Henry. C Emery.* 8vo. 1896	The Editor, Prof. E. R. A. Seligman

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Yale Review. Vol. v, No. 4. 1897	The Editor
Actuarial Society of America. Papers and Transactions. Vol. iv, No. 16, Oct., 1896. 8vo.	The Society
American Academy of Political and Social Science. Annals. Vol. ix, No. 1 and 2, 1897	The Academy
American Economic Association. Economic Studies, Vol. i, Nos. 5 and 6. The Street Railway Problem in Cleveland: *W. R. Hopkins.* 1896. Vol. ii, No. 1. Economics and Jurisprudence: *H. C. Adams.* 1897. Supplement to Econ. Studies: Handbook of the Association, 1897, with report of 9th Annual Meeting	The Association
American Geographical Society. Bulletin. Plates. (Current numbers)	The Society
American Philosophical Society. Transactions. New Series. Vol. xix, part 1. 4to. 1896	"
American Statistical Association. Quarterly Publications. New Series. Nos. 35 and 36. 1896	The Association
Leland Stanford Junior University Publications. Contributions to Biology. Nos. 5—8. 8vo. 1896	The University
Smithsonian Institution—	
Smithsonian Contributions to Knowledge. Hodgkins Fund. Argon, a new constituent of the atmosphere. 4to. 1896. Also vols. xxx–xxxii. 4to. 1895. Plates	The Institution
Smithsonian Miscellaneous Collections: Hodgkins Fund. Method for determination of organic matter in air. 8vo. 1896. Index to genera species of the Foraminifera. Part 2. 8vo. 1896	
Uruguay—	
Anuario Estadistico de la Republica. Año 1895. Plates and diagrams, la. 8vo.	The Statistical Bureau
Montevideo. Boletin mensual demografico de Montevideo. (Current numbers)	The Municipal Statistical Bureau
International—	
Bulletin International des Douanes. (Current numbers.) 8vo.	The Board of Trade
Report of first international Co-operative Congress, London, August, 1895. Portraits, 8vo.	Purchased

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(b) India and Colonial Possessions.

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Trade of India. Review of, in 1895-96, by J. E. O'Conor, C.I.E. Diagrams. [C–8297]	
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Canada, Dominion of—	
Sessional Papers. Session 1896. *Vols.*—	
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2. Public Accounts for 1894-95. List of Shareholders in Chartered Banks, 1895. Dividends remaining unpaid, 1895.....	
3. Report of Superintendent of Insurance for 1895. Statements of Insurance Companies for 1895	
4. Report of Department of Trade and Commerce for 1894-95. Report of High Commissioner in connection with Department of Trade and Commerce. Tables of Trade and Navigation for 1894-95	
5. Inland Revenues for 1894-95. Report of Minister of Agriculture for 1895, &c.	
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7. Report of Minister of Public Works for 1894-95. Report and Statistics relating to Railways and Canals for 1894-95	
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9. Report on Steamboat Inspection for 1895. Report of Postmaster-General for 1894-95.....	
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Agriculture and Colonisation. Report of Select Standing Committee on, 1896.....	
Atlantic Steamship Line between Great Britain and Canada. Papers relating to, 1896	
Census of Canada, 1890-91. Vol. 4	
Civil Service List of Canada, 1896	
Criminal Statistics for 1894-95	
Debates of the House of Commons of Canada. Official Report. 2nd Session, 1896. 1 vol.	
Geological Survey Depart. Summary report, 1896	
Inland Revenues. Report, &c., for 1895-96. Part 1. Excise. Part 2. Inspection of Weights, Measures, &c. Part 3. Adulteration of Food	
Journals of House of Commons. Session 1896.....	
Journals of the Senate. Session 1896.....	
Mineral production in 1896	
Public Accounts for 1895-96.....	
Secretary of State. Report of, for 1896.....	
Trade and Commerce. Quarterly Report of Department of, to 30th September, 1896.....	
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Ontario. Statistics of Ontario. 1896. Crops and Live Stock in Ontario. 1896. Road Bulletin, No. 2. Rations for Dairy Cows, &c. Dec., 1896. 8vo.	The Ontario Bureau of Industries
Insurance and Finance Chronicle. (Current numbers)	The Editor
Cape of Good Hope—	
Agricultural and Live Stock returns for 1895-96. Fol. Births and Deaths. Second (final) report of the Registrar for 1895. Fol.	The Under Colonial Secretary
Ceylon—	
Administration Reports for 1895. Diagrams, &c., fol. Papers laid before the Legislative Council during the Session of 1895. Maps, &c., fol.	The Government of Ceylon
Jamaica—	
Annual Report of Registrar-General for year ended 31st March, 1896. Fol.	The Registrar-General
New South Wales—	
Public Works. Report of Department of, for 1894-95. Diagrams, fol. Statistical Account of the seven colonies of Australasia, 1895-96. Sixth issue. Map, 8vo.	The Agent-General for New South Wales
Statistical Register for 1895. Parts 3, Public Finance; 5, Land Settlement; 6, Agriculture, &c., Fisheries, and Mining, with Appendix; 7, Manufactories and Works; 10, Education, Science, and Art. 8vo.	The Government Statist
Sydney. Government Statisticians' Report on Vital Statistics of Sydney and Suburbs for 1895. Fol.	
New Zealand—	
Census, 1896. Preliminary Tables: Religions; Places of Worship, Public Libraries, and Mechanics' Institutes; Birth-places of the People; Industries. Slips, fol. Statistics of the Colony for 1895. Fol.	The Registrar-General of New Zealand
Labour Department. Journal of the. 8vo. (Current numbers)	The Labour Department
New Zealand Trade Review and Price Current. (Current monthly numbers)	The Editor
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Queensland past and present. An epitome of its resources and development. 1896. First issue. 8vo.	Mr. Thornhill Weedon, the Compiler
Statistics of the Colony for 1895. Fol. Supplements to the Government Gazette (containing Vital Statistics). (Current numbers)	The Registrar-General of Queensland
South Australia—	
Australasian Statistics for 1894. Fol. Statistical Register, 1895. Fol.	The Chief Secretary

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Statistics of the Colony for 1895. Fol.	The Government Statistician
Victoria—	
Friendly Societies. 18th Annual Report on, for 1895.	The Assistant Government Statist
Statistical Register for 1895. Parts 5, Vital Statistics, &c.; 7, Law, Crime, &c.	
Royal Society of Victoria. Proceedings. New Series. Vol. viii. Plates, 8vo. 1896	The Society
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Army Medical Department. Report for 1895, with Appendix. Vol. xxxvii. 8vo.	The Department
Board of Trade Journal. (Current monthly numbers)	The Board of Trade
Foreign Office Reports on Trade and Finance. Annual and Miscellaneous Series. (Current numbers)	Purchased
Labour Department of Board of Trade. Third Annual Report (1895-96), with Abstract of Labour Statistics. [C-8230.] 8vo.	The Board of Trade
Labour. Co-operative Contracts. Report on contracts given out by public authorities to associations of workmen. 8vo. [C-8233.] 1896	
Labour Gazette. Journal of Labour Department of Board of Trade. (Current monthly numbers)	
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Statistical Abstract for the several Colonial and other Possessions of the United Kingdom in each year from 1881 to 1895. [C-8210.] 8vo. 1895	The Board of Trade
Trade Unions. Eighth Annual Report by the Chief Labour Correspondent on, (1894 and 1895), with Statistical Tables. [C-8232.]	
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Agriculture. Journal of the Board of. Vol. iii, Nos. 3 and 4. 1896-97. 8vo.	The Board of Agriculture
Agricultural Holdings. Returns as to number and size of, in 1895. [C-8243]	
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Judicial Statistics for 1895. Part 1. Criminal Statistics. [C-8352.] 4to.	The Home Office
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Report on Fires in London and the work of the Brigade during 1896. Fol.	The London County Council
Annual Report of the Medical Officer of Health of the London County Council for 1895. Diagrams.	
London Technical Education Gazette. (Current numbers)	
London School Board. Reports of School Accommodation and Attendance Committee for year ending Lady-day, 1896. 2 vols. La. fol.	The Board
Fulham Free Public Library. 9th Annual Report, 1896. 8vo.	The Librarian
Bradford. Report on Health of, for 1895, with Report on Infectious Diseases Hospital. Diagram.	The Medical Officer of Health
Manchester. Health of, Weekly and Quarterly Returns of the Medical Officer. (Current numbers)	,,
Ireland—	
Births and Deaths in Dublin and in fifteen of the principal Urban Sanitary Districts. (Current weekly returns)	The Registrar-General of Ireland
Quarterly Return of Marriages to Sept.; Births and Deaths to Dec., 1896. No. 132	
Scotland—	
Births, Deaths, and Marriages in the eight principal Towns. (Current weekly and monthly returns)	The Registrar-General of Scotland
Quarterly Return of Births, Deaths, and Marriages registered during quarter ending 31st Dec., 1896	
Aberdeen. Reports by Medical Officer of Health and Sanitary Inspector. (Current numbers.) 8vo.....	The Medical Officer of Health
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Barclay (*Robert*). The Silver Question and the Gold Question. Fourth Edition. iv + 222 pp., 8vo. [1894]	The Author
Brassey (*Lord*), K.C.B. British Industry and Foreign Competition. 24 pp., 8vo. 1896.....	,,
Brough (*Bennett H.*). Mining at great depths. 18 pp., 8vo. 1896	,,
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Da Veiga Filho (*Dr. João Pedro*)—	
Estudo Economico e Financeiro sobre o Estado de S. Paulo. 137 pp., 8vo. São Paulo, 1896.....	The Author
Economia e financas. Monographia sobre Tarifas aduaneiras. 69 pp., 8vo. São Paulo, 1896	

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Dictionary of Political Economy. Edited by R. H. Inglis Palgrave, F.R.S. Vol. 2, F—M. 8vo. 1896	Messrs. Macmillan
Fechner (*G. Th.*). Ueber den Ausgangswerth der kleinsten Abweichungssumme, dessen Bestimmung, Verwendung und Verallgemeinerung. 76 pp., la. 8vo. Leipzig, 1874	Purchased
Fornasari di Verce (*Dott E.*). Suicidi e fallimenti, note intorno alla ricerca delle cause nella statistica morale. 11 pp., diagram, 8vo. 1897	The Author
Gardner (*R. Core*). Patent Office Statistics. 33 pp., 8vo. 1896	The Society of Patent Agents
Gibbins (*H. de B.*). Industry in England, historical outlines. xx + 479 pp., maps, 8vo. 1896	Purchased
Halle (*Ernst von*). Trusts or Industrial Combinations and Coalitions in the United States. xvi + 350 pp., diagrams, 8vo. New York, 1895	,,
Hewat (*Archibald*). Life Assurance Finance as affected by rate of interest and rate of expense. 30 pp., diagrams, 8vo. 1896	The Author
Higgs (*Henry*). The Physiocrats. Six lectures on the French *Economistes* of the 18th Century. x + 158 pp., 8vo. 1897	Messrs. Macmillan
Houdard (*Adolphe*). Le Malentendu monétaire. Etude critique de Monométallisme-or et du Bimétallisme à rapport constant. 48 pp., 8vo. [1897]	The Author
Hunter (*Sir Robert*). The preservation of open Spaces, and of Footpaths, and other rights of Way. A practical treatise on the law of the subject. xxii + 424 pp., 8vo. 1896	Purchased
Issajew (*Dr. A. A.*). Gegenwart und Zukunft der russischen Volkswirthschaft. 2 parts, 8vo. Berlin, 1896	The Author
Morrison (*W. Douglas*). Juvenile Offenders. xx + 317 pp., 8vo. 1896	,,
Mulhall (*Michael G.*). Industries and Wealth of Nations. xii + 451 pp., diagrams, 8vo. 1896	,,
Noble (*John*). National Finance: a review of the policy of the last two Parliaments and of the results of modern fiscal legislation. 368 pp., 8vo. 1875	Purchased
Pareto (*Vilfredo*). Cours d'Economie Politique professé à l'Université de Lausanne. 2 vols., 8vo. Lausanne, 1896-97	,,
Plehn (*Carl C.*). Introduction to Public Finance. xii + 364 pp., 8vo. New York, 1896	,,
Quetelet (*Ern.*). Mémoire sur la température de l'air à Bruxelles, 1833-72. (Supplément.) 52 pp., diagrams, 4to. Brux., 1876	The Registrar-General of England
Seyd (*Richard*). Statistics of Failures in the United Kingdom during 1896. 2 pp., slip	The Author
Wilbur (*Cressy L.*). How the establishment of a permanent Census Bureau will improve the Vital Statistics of the United States. 8 pp., map, 8vo. 1897	,,
Woodworth (*Arthur V.*). Report of an inquiry into the condition of the Unemployed, conducted under the Toynbee Trust, Winter, 1895-96. 65 pp., 8vo. 1897	,,

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British Association. Report of 66th meeting held at Liverpool in September, 1896. Plates. 8vo.; also Preliminary Programme of Toronto meeting, 1897. Plates, &c. 8vo.	The Association
British Association. Ethnographical Survey of United Kingdom. Fourth report of Committee. 8vo. 1896	Mr. E. Sidney Hartland
British Economic Association. Economic Journal. No. 24. Dec., 1896	The Association
Economic Review. Vol. vii, No. 1. 8vo. 1897	The Publisher
East India Association. Journal. (Current numbers)	The Association
Glasgow Philosophical Society. Proceedings. Vol. xxvii, 1895-96. Plates, 8vo. 1896	The Society
Imperial Institute. Journal. (Current monthly numbers)	The Institute
Institute of Bankers. Journal. (Current numbers)	,,
Iron and Steel Institute. Journal. Vol. 50. (No. 2, 1896.) Plates, 8vo. 1897	,,
Liverpool Literary and Philosophical Society. Proceedings. No. 50, session 1895-96. Plates &c. 8vo.	The Society
London Chamber of Commerce Journal. (Current numbers)	The Chamber of Commerce
London Hospital. General Statement of number of Patients under treatment during 1896. Sheet	The Hospital
Manchester Literary and Philosophical Society. Memoirs and Proceedings. Vol. 41, part 2. 1896-97	The Society
Manchester Statistical Society. Economic results of the ship canal on Manchester and the surrounding district: *A. W. Fletcher.* English Mortality from Phthisis in 1881-90: *T. A. Welton.* Registration of Parliamentary and Local Government Electors: *J. Wigley.* 8vo. 1897	The Society
Peabody Donation Fund. 32nd Annual Report of the Trustees for 1896, with supplementary statement. 4to.	The Secretary
Royal Agricultural Society. Journal. Third series. Vol. vii, part 4. 1896	The Society
Royal Asiatic Society. Journal for Jan., 1897	,,
Royal Geographical Society. Geographical Journal. (Current numbers)	,,
Royal Irish Academy. Proceedings. 3rd Series. Vol. iv. No. 1, Dec., 1896	The Academy
Royal Society. Proceedings. (Current numbers)	The Society
Royal United Service Institution. Journal. (Current numbers)	The Institution
Sanitary Institute. Journal of the Institute. Vol. xvii. Part 4. Jan., 1897	The Institute
Society of Arts. Journal. (Current numbers)	The Society
South Place Ethical Society. The South Place Magazine. Vol. i, Nos. 1—12. 8vo. 1896	Mr. J. R. Carter
Surveyors' Institution. Transactions. (Current numbers)	The Institution

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Bankers' Magazine, The	,,	,,
Bimetallist, The	,,	,,
British Trade Journal, The	,,	,,
Building Societies Gazette, The	,,	,,
Colliery Guardian, The	,,	,,
Commercial World, The	,,	,,
Economist, The	,,	,,
Finance Chronicle, The	,,	,,
Fireman, The	,,	,,
Incorporated Accountants' Journal	,,	,,
Insurance Post, The	,,	,,
,, Record, The	,,	,,
Investors' Monthly Manual, The	,,	,,
Iron and Coal Trades' Review, The	,,	,,
Johannesburg Standard and Diggers' News. London Edition	,,	,,
Licensing World, The	,,	,,
Machinery Market, The	,,	,,
Nature	,,	,,
Policy-Holder, The	,,	,,
Post Magazine, The	,,	,,
Review, The	,,	,,
Sanitary Record, The	,,	,,
Shipping World, The	,,	,,
Statist, The	,,	,,
Brewers' Almanack and Wine and Spirit Trade Annual for 1897		Mr. Percy C. Morgan
Mitchell's Newspaper Press Directory. 52nd annual issue, 1897. Portraits, la. 8vo.		The Publishers
Post Magazine Almanack, the Insurance Directory, &c., 1897. 8vo.		,,
Sell's Dictionary of the World's Press, British Empire edition, 1897. 8vo		,,
Almanach de Gotha, 1897		Purchased
Australian Handbook, 1897. (Gordon and Gotch)		,,
Banking Almanac, 1897		,,
British Almanac, 1897		,,
Burdett's Official Intelligence. Vol. xv. 1897		,,
County Councils and Municipal Corporations' Companion for 1897		,,
Financial Reform Almanack, 1897		,,
Ham's Inland Revenue Year-Book, 1897		,,
Hazell's Annual for 1897		,,
Howe's Classified Directory to Metropolitan Charities for 1897		,,
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VI.—PERIODICAL RETURNS.

REGISTRATION OF THE UNITED KINGDOM.

No. I.—ENGLAND AND WALES.

MARRIAGES—To 30th September, 1896.

BIRTHS and DEATHS—To 31st December, 1896.

A.—*Serial Table of* Marriages, Births, *and* Deaths, *returned in the Years* 1896-90, *and in the* Quarters *of those Years.*

Calendar Years, 1896-90:—*Numbers.*

Years.....	'96.	'95.	'94.	'93.	'92.	'91.	'90.
Marriages No.	—	227,865	226,449	218,689	227,135	226,526	223,028
Births..... ,,	917,201	921,860	890,289	914,572	897,957	914,157	869,937
Deaths .... ,,	527,929	568,758	498,827	569,958	559,684	587,925	562,248

Quarters *of each Calendar Year,* 1896-90.

(I.) Marriages:—*Numbers.*

Qrs. ended last day of	'96.	'95.	'94.	'93.	'92.	'91.	'90.
March..... No.	43,199	39,555	47,809	40,243	42,835	49,203	40,905
June ..... ,,	65,833	60,603	53,509	58,928	59,958	52,678	59,180
September ,,	65,014	60,973	60,062	58,539	58,264	58,651	57,143
December ,,	—	66,734	65,069	60,979	66,078	65,994	65,800

(II.) Births:—*Numbers.*

Qrs. ended last day of	'96.	'95.	'94.	'93.	'92.	'91.	'90.
March..... No.	222,582	240,455	228,862	231,133	219,999	229,133	225,640
June ..... ,,	231,213	233,207	220,955	235,334	232,329	239,480	220,060
September ,,	227,845	231,724	215,851	229,396	228,771	224,580	220,769
December ,,	235,561	216,474	224,621	218,709	216,858	220,964	203,468

(III.) Deaths:—*Numbers.*

Qrs. ended last day of	'96.	'95.	'94.	'93.	'92.	'91.	'90.
March..... No.	136,809	170,501	147,964	144,291	182,614	157,987	165,318
June ..... ,,	124,950	130,411	118,651	133,064	132,080	171,842	128,625
September ,,	126,541	133,569	107,441	143,555	116,008	116,690	122,515
December ,,	139,629	134,277	124,771	149,048	128,982	141,406	145,790

Annual Rates of Marriages, Births, *and* Deaths, *per* 1,000 Persons Living *in the Years* 1896-90, *and in the* Quarters *of those Years.*

Calendar Years, 1896-90 :—*General Ratios.*

Years.....	'96.	Mean '86-95.	'95.	'94.	'93.	'92.	'91.	'90.
Estmtd. Popln. of England and Wales *in thousands* in middle of each Year....	30,717,	—	30,383,	30,052,	29,725,	29,402,	29,082,	28,764,
Persons Married	—	14·9	15·0	15·1	14·7	15·4	15·6	15·5
Births	29·7	31·0	30·3	29·6	30·8	30·5	31·4	30·2
Deaths.....	17·1	18·8	18·7	16·6	19·2	19·0	20·2	19·5

Quarters *of each Calendar Year,* 1896-90.

(I.) Persons Married :—*Ratio per* 1,000.

Qrs. ended last day of	'96.	Mean '86-95.	'95.	'94.	'93.	'92.	'91.	'90.
March	11·3	11·8	10·6	12·9	11·0	11·7	13·7	11·5
June.....	17·2	15·4	16·0	14·3	15·9	16·4	14·5	16·5
September	16·8	15·3	15·9	15·9	15·6	15·7	16·0	15·8
December	—	17·3	17·4	17·2	16·3	17·8	18·0	18·2

(II.) Births:—*Ratio per* 1,000.

Qrs. ended last day of	'96.	Mean '86-95.	'95.	'94.	'93.	'92.	'91.	'90.
March	29·1	31·7	32·1	30·9	31·5	30·0	32·0	31·8
June...	30·2	31·8	30·8	29·5	31·7	31·7	33·0	30·7
September	29·4	30·7	30·2	28·5	30·7	30·9	30·6	30·5
December	30·1	29·8	28·3	29·6	29·2	29·3	30·1	28·1

(III.) Deaths:—*Ratio per* 1,000.

Qrs. ended last day of	'96.	Mean '86-95.	'95.	'94.	'93.	'92.	'91.	'90.
March	17·9	21·8	22·8	20·0	19·7	24·9	22·0	23·3
June.....	16·3	18·3	17·2	15·8	18·0	18·0	23·7	17·9
September	16·3	16·8	17·4	14·2	19·2	15·7	15·9	16·9
December	17·9	18·5	17·5	16·5	19·9	17·4	19·3	20·1

B.—*Special Town Table:*—POPULATION; BIRTH-RATE *and* DEATH-RATE *in each Quarter of* 1896, *in* THIRTY-THREE *Large Towns.*

Cities and Boroughs.	Estimated Population in the Middle of the Year 1896.	Annual Rate to 1,000 Living during the Thirteen Weeks ending							
		28th Mar., 1896. (1st Quarter.)		27th June, 1896. (2nd Quarter.)		26th Sept., 1896. (3rd Quarter.)		2nd Jan., 1897. (4th Quarter.)	
		Births.	Deaths	Births.	Deaths.	Births.	Deaths.	Births.	Deaths.
Thirty-three towns	10,846,971	30·4	19·5	31·1	18·2	30·1	19·1	31·3	18·8
London*	4,421,955	30·3	19·5	30·3	17·9	29·4	18·8	30·7	18·1
West Ham	261,297	33·1	15·5	32·7	14·4	31·6	19·0	33·0	15·5
Croydon	118,006	24·3	14·4	24·9	14·4	25·2	13·5	25·8	14·6
Brighton	120,499	24·9	16·6	26·0	14·1	23·2	16·4	24·6	17·3
Portsmouth	178,639	27·7	16·3	27·6	15·6	26·1	18·8	28 8	15·6
Plymouth	90,276	29·4	18·3	28·9	17·9	28·0	19·0	28·9	22·9
Bristol	230,623	28·7	18·4	27·9	16·7	26·8	15·6	27·0	16·9
Cardiff	162,690	33·4	15·4	32·4	15·4	33·6	17·6	35·7	18·8
Swansea	98,645	30·9	16·8	30·0	15·1	31·1	14·7	30·0	20·6
Wolverhampton	86,530	33·5	19·6	33·8	17·3	33·8	21·0	36·2	21·7
Birmingham	501,241	31·6	21·4	33·3	19·9	32·4	21·9	33·0	20·1
Norwich	108,630	29·7	21·9	30·9	15·0	29·1	14·9	33·3	17·7
Leicester	198,659	30·1	19·5	30·7	14·5	30·5	18·1	31·7	14·9
Nottingham	229,775	28·3	16·3	3 ·8	16·7	27·8	16·7	28·8	20·1
Derby	101,770	26·1	16·8	28·6	15·4	29·5	15·1	27·9	15·4
Birkenhead	109,343	29·2	19·4	32·8	18·8	31·8	18·7	33·0	19·8
Liverpool	632,512	34·1	23·8	35·4	21·1	34·7	22·9	35·2	23·1
Bolton	120,380	31·6	22·4	31·1	19·8	30·1	19·8	32·4	20·9
Manchester	529,561	32·5	23·2	34·4	23·6	32·0	22·0	33·2	21·9
Salford	210,707	33·7	23·2	35·8	23·6	34·3	23·8	35·9	20·0
Oldham	143,442	26·3	21·2	27·8	20·7	26·5	18·8	28·3	20·4
Burnley	102,805	29·7	18·6	31·2	16·7	30·4	16·0	32·8	18·7
Blackburn	129,459	26·1	18·4	28·1	16·5	26·9	16·1	29·7	20·3
Preston	113,864	33·3	22·2	33·7	18·1	32·2	20·0	31·4	22·6
Huddersfield	100,463	19·3	16·4	19·7	16·6	20·4	15·5	22·6	17·4
Halifax	94,775	24·3	19·8	24·8	17·2	23·5	14·7	24·4	17·6
Bradford	228,809	25·7	17·0	25·6	16·1	25·2	15·5	25·7	17·4
Leeds	402,449	29·5	18·6	30·9	18·8	30·8	18·4	31·7	19·1
Sheffield	347,278	32·9	19·4	34·9	18·7	33·5	20·2	34·8	18·7
Hull	220,844	31·2	17·0	33·7	17·3	31·1	20·9	31·9	20·3
Sunderland	140,386	34·6	18·4	33·7	21·9	33·5	20·5	34·7	,18·6
Gateshead	98,436	34·6	17·5	36·3	17·4	35·9	21·4	3 :·5	20·0
Newcastle	212,223	29·4	19·1	31·6	18·0	31·4	18·4	31·9	18·3

* Including deaths of Londoners in the metropolitan workhouses, hospitals, and lunatic asylums situated outside Registration London, but excluding deaths of persons not belonging to London occurring in Highgate Small-Pox Hospital, in the London Fever Hospital, in the Metropolitan Asylum Board hospitals, and in the Middlesex County Lunatic Asylum, within Registration London. The provincial towns have been similarly corrected.

C.—*Divisional Table:*—MARRIAGES *in the Year ending 30th September; and* BIRTHS *and* DEATHS *in the Year ending 31st December*, **1896**, *as Registered Quarterly.*

1	2	3	4	5	6	7
DIVISIONS. (England and Wales.)	AREA in Statute Acres.	Enumerated POPULATION, 1891.	MARRIAGES in Quarters ending 31st December, 1895.	31st March, 1896.	30th June, 1896.	30th September, 1896.
		No.	No.	No.	No.	No.
ENGLD. & WALES....*Totals*	37,239,351	29,002,525	66,734	43,199	65,833	65,014
I. London	74,692	4,211,743	10,718	6,729	10,589	11,488
II. South-Eastern	3,991,604	2,867,538	6,104	3,443	5,696	5,651
III. South Midland	3,238,579	1,863,469	3,988	1,975	3,660	3,854
IV. Eastern	3,136,622	1,575,311	3,712	1,830	2,874	2,971
V. South-Western	4,997,695	1,908,998	3,947	2,585	3,856	3,442
VI. West Midland	3,964,632	3,250,007	7,729	4,730	7,814	7,187
VII. North Midland	3,535,223	1,806,415	4,251	2,567	4,446	3,801
VIII. North-Western	1,951,126	4,660,594	10,232	7,934	11,106	11,609
IX. Yorkshire	3,726,829	3,218,882	7,659	5,216	7,570	7,363
X. Northern	3,528,621	1,863,163	4,108	3,216	4,421	3,965
XI. Monmthsh. & Wales	5,093,728	1,776,405	4,286	2,974	3,801	3,683

8	9	10	11	12	13	14	15	16
DIVISIONS. (England and Wales.)	BIRTHS in each Quarter of **1896** ending 31st March.	30th June.	30th September.	31st December.	DEATHS in each Quarter of **1896** ending 31st March.	30th June.	30th September.	31st December.
	No.	No.	No.	No.	No.	No.	No.	No.
ENGLD. & WALES....*Totals*	222,582	231,213	227,845	235,561	136,809	124,950	126,541	139,629
I. London	33,552	33,393	32,386	36,465	21,219	19,312	20,390	21,058
II. South-Eastern	19,218	19,838	19,433	20,144	11,541	10,016	10,648	11,492
III. South Midland	13,309	13,949	13,780	13,847	7,767	6,821	6,993	7,639
IV. Eastern	12,154	12,631	12,305	12,806	7,110	5,934	6,438	6,762
V. South-Western	12,160	12,869	12,935	12,924	8,970	6,890	6,731	8,138
VI. West Midland	25,151	26,493	26,322	26,870	15,829	14,134	14,203	16,183
VII. North Midland	14,282	14,821	14,726	15,012	7,989	7,024	7,368	8,761
VIII. North-Western	37,536	38,853	38,169	39,170	24,957	23,483	22,637	25,438
IX. Yorkshire	24,370	25,585	25,651	26,084	14,998	14,661	14,489	15,841
X. Northern	15,962	16,851	16,498	16,599	8,446	8,448	8,720	9,169
XI. Monmthsh. & Wales	14,888	15,930	15,640	15,640	8,883	8,227	7,924	9,148

D.—*General Meteorological Table,*

[Abstracted from the particulars supplied to the

1896. Months.	Temperature of Air. Mean.	Air. Diff. from Average of 125 Years.	Air. Diff. from Average of 55 Years.	Evaporation. Mean.	Evaporation. Diff. from Average of 55 Years.	Dew Point. Mean.	Dew Point. Diff. from Average of 55 Years.	Air—Daily Range. Mean.	Air—Daily Range. Diff. from Average of 55 Years.	Water of the Thames	Elastic Force of Vapour. Mean.	Elastic Force of Vapour. Diff. from Average of 55 Years.	Weight of Vapour in a Cubic Foot of Air. Mean.	Weight of Vapour in a Cubic Foot of Air. Diff. from Average of 55 Years.
	°	°	°	°	°	°	°	°	°		In.	In.	Grs.	Gr.
Jan.....	40·5	+3·9	+2·3	39·1	+2·4	37·4	+2·8	8·2	−1·3	...	·224	+·025	2·6	+0·3
Feb.....	40·3	+1·6	+1·1	38·4	+0·9	35·9	+1·0	10·3	−0·8	...	·211	+·005	2·5	+0·1
Mar. ...	45·7	+4·6	+4·1	43·1	+4·0	40·3	+4·5	13·4	−1·4	...	·250	+·037	2·9	+0·4
Means...	42·2	+3·4	+2·5	40·2	+2·4	37·9	+2·8	10·6	−1·2	...	·228	+·022	2·7	+0·3
April ...	48·6	+2·5	+1·6	44·8	+1·0	40·7	+0·4	16·3	−2·2	...	·254	+·003	2·9	0·0
May.....	54·8	+2·2	+2·1	49·2	+0·3	43·9	−1·1	21·6	+1·0	...	·287	−·011	3·3	−0·1
June ...	63·4	+5·1	+4·4	57·6	+3·0	52·7	+2·0	21·8	+0·7	...	·399	+·028	4·4	+0·4
Means...	55·6	+3·3	+2·7	50·5	+1·4	45·8	+0·4	19·9	−0·2	...	·313	+·007	3·5	+0·1
July.....	65·2	+3·6	+3·2	58·1	+0·5	52·3	−1·7	22·8	+2·0	...	393	−·022	4·3	−0·4
Aug. ...	59·2	−1·7	−2·2	55·2	−2·2	51·6	−2·4	17·3	−2·5	...	·382	−·035	4·3	−0·4
Sept. ..	56·7	+0·1	−0·4	54·2	+0·2	52·0	−0·9	13·3	−5·0	...	·388	+·010	4·4	+0·1
Means...	60·4	+0·7	+0·2	55·8	−0·5	52·0	−1·7	18·1	−1·8	...	·388	−·016	4·3	−0·2
Oct.....	46·5	−2·9	−3·2	44·6	−3·1	42·5	−3·0	12·8	−1·7	...	·272	−·034	3·1	−0·7
Nov. ...	40·6	−1·9	−3·0	38·6	−3·0	36·0	−3·7	9·8	−1·5	...	·212	−·035	2·5	−0·4
Dec. ...	40·2	+1·2	+0·5	38·8	+0·6	37·0	+0·7	8·2	−1·2	...	·220	+·004	2·5	−0·1
Means...	42·4	−1·2	−1·9	40·7	−1·8	38·5	−2·0	10·3	−1·5	...	·235	−·022	2·7	−0·4

Note.—In reading this table it will be borne in mind that the sign (−) minus signifies

(Compiled from observations

for the Year ended 31*st December*, 1896.

Registrar-General by JAMES GLAISHER, F.R.S., &c.]

Degree of Humidity.		Reading of Barometer.		Weight of a Cubic Foot of Air.		Rain.		Daily Horizontal Movement of the Air.	Reading of Thermometer on Grass.					1896. Months.
									Number of Nights it was			Lowest Reading at Night.	Highest Reading at Night.	
Mean.	Diff. from Average of 55 Years.	Mean.	Diff. from Average of 55 Years.	Mean.	Diff. from Average of 55 Years.	Amnt.	Diff. from Average of 81 Years.		At or below 30°.	Between 30° and 40°.	Above 40°.			
		In.	In.	Grs.	Grs.	In.	In.	Miles.				°	°	
90	+ 3	30·173	+ ·413	559	+ 5	0·64	−1·22	251	9	21	1	22·2	41·8	January
86	+ 2	30·152	+ ·319	559	+ 6	0·35	−1·19	232	15	11	3	17·4	41·8	Feb.
82	+ 1	29·641	− ·109	543	− 7	3·00	+1·48	379	6	18	7	25·3	48·0	March
86	+ 2	29·989	+ ·218	554	+ 1	Sum 3·99	Sum −0·93	Mean 287	Sum 30	Sum 50	Sum 11	Lowest 17·4	Highst 48·0	Means
74	− 5	29·976	+ ·229	547	+ 4	0·56	−1·1	265	2	22	6	27·5	46·5	April
66	−12	30·046	+ ·259	541	+ 1	0·27	−1·75	263	1	13	17	27·2	54·7	May
68	− 6	29·766	− ·048	526	− 6	1·94	0·00	233	0	1	29	37·2	57·5	June
69	− 8	29·929	+ ·146	538	0	Sum 2·77	Sum −2·89	Mean 254	Sum 3	Sum 36	Sum 52	Lowest 27·2	Highst 57·5	Means
62	−13	29·843	+ ·054	526	− 2	1·07	−1·53	242	0	0	31	42·8	58·7	July
76	− 1	29·818	+ ·068	532	+ 3	2·06	−0·32	220	0	0	31	42·5	57·0	August
85	+ 4	29·592	− ·218	530	− 4	5·54	+3·24	297	0	1	29	38·2	56·0	Sept.
74	− 3	29·761	− ·032	529	− 1	Sum 8·67	Sum +1·39	Mean 253	Sum 0	Sum 1	Sum 91	Lowest 38·2	Highst 58·7	Means
87	− 2	29·557	− ·154	541	+ 1	2·80	−0·01	312	2	17	12	28·7	53·0	October
84	− 7	29·958	+ ·215	555	+ 7	1·19	−1·16	277	10	17	3	24·0	40·3	Nov.
89	0	29·611	− ·181	549	− 4	3·00	+1·04	311	8	20	3	25·3	40·3	Dec.
87	− 3	29·709	− ·040	548	+ 1	Sum 6·99	Sum −0·13	Mean 300	Sum 20	Sum 54	Sum 18	Lowest 24·0	Highst 53·0	Means

below the average, and that the sign (+) plus signifies above the average.

made at Greenwich.)

E.—*Comparative Table of* Consols, Provisions, Coal, *and* Pauperism *in each* Quarter *of* 1894-95-96.

Quarters ending	Average Prices of: 2¾*l.* per Cent. Consols (for Money) per 100*l.* Stock.	Discount charged by the Bank of England.*	Wheat per Quarter in England and Wales.†	Meat per Pound at the Metropolitan Meat Market (by the Carcase).‡ Beef. Inferior Quality.	Beef. Second Quality.	Beef. First Quality.	Mutton. Inferior Quality.	Mutton. Second Quality.	Mutton. First Quality.	Coal (Seaborne) in the London Market per Ton.§	Pauperism. Quarterly Average of the Number of Paupers Relieved on the *Last Day* of each Week. In-door.	Out-door.
	£ *s. d.*	£	*s. d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*s. d.*		
1894												
Mar. 31	99 5 4	2·46	25 1	3½	5⅞	6¾	5¼	7¼	8⅜	18 1	207,768	526,112
June 30	100 12 2	2·00	24 4	3⅜	5⅞	6¾	5¼	7⅜	8½	15 6	188,709	501,180
Sept. 30	101 19 7	2·00	22 11	3⅜	6	6⅞	5⅝	7⅞	8⅞	15 3	184,733	496,223
Dec. 31	102 8 7	2·00	19 2	3¾	5¾	6⅝	5½	8¼	9⅛	15 7	201,695	504,865
1895												
Mar. 31	104 9 9*	2·00	20 1	4	5⅞	6⅝	6½	8⅝	9½	15 –	218,050	580,669
June 30	105 16 8*	2·00	23 1	4⅛	6¼	6¾	6⅛	7⅝	8⅝	14 1‖	193,721	528,714
Sept. 30	107 9 8*	2·00	23 11	4	5⅞	6⅞	5½	7⅞	8⅝	14 0	188,971	515,313
Dec. 31	106 17 0*	2·00	25 1	3⅝	5¾	6⅞	5½	8⅛	8⅞	15 3	205,028	519,024
1896												
Mar. 31	108 9 6*	2·00	25 8	3½	5¾	6⅝	5	7¾	8⅛	14 6	212,102	535,813
June 30	112 1 6*	2·00	25 2	3⅜	5½	6½	4⅞	7⅛	7⅞	13 6‖	193,072	517,456
Sept. 30	112 8 7*	2·15	23 7	3½	5⅝	6½	4¾	7	8	13 1	188,862	508,700
Dec. 31	110 2 8*	3·77	30 5	3½	5⅝	6¾	4¾	7¼	8⅛	16 2	205,270	512,660

* Furnished by the Chief Cashier of the Bank of England.
† As published by the Board of Agriculture.
‡ Reduced from quotations published by the Board of Agriculture.
§ The prices of coal are furnished by the Mineral Statistics Department of the Home Office.
‖ Sunderland coal only.

F.—*Special Average Death-Rate Table:*—Annual Rate *of* Mortality *per* 1,000 *in* Town *and* Country Districts *of* England *in each Quarter of the Years* 1894-96.

	Area in Statute Acres.	Population Estimated in the middle of 1896.	Quarters ending	Annual Rate of Mortality per 1,000 in each Quarter of the Years: 1896.	Mean '86-95.	1895.	1894.
Town Districts. The 100 Towns, together with all Registration Sub-Districts three-fourths of the population of which, as enumerated in 1891, resided within the boundaries of Urban Sanitary Districts*	4,222,051	20,840,269	March	18·5	22·3	23·4	20·0
			June	17·2	18·9	17·4	16·2
			Sept.	17·6	18·0	18·9	14·9
			Dec.	18·6	19·7	18·5	17·1
			Year	18·0	19·7	19·5	17·1
Country Districts. All the remaining Registration Sub-Districts of England and Wales—not coming within the above definition of Town Districts	33,095,834	9,877,086	Year	15·3	17·2	17·0	15·6
			March	16·6	20·8	21·5	19·8
			June	14·5	17·2	16·9	15·0
			Sept.	13·7	14·5	14·4	12·7
			Dec.	16·3	16·5	15·5	15·0

* For the years prior to 1894 the figures relate to the 33 great Towns; 67 other large Town districts (represented approximately by Registration Districts or Sub-Districts); and all other Registration Sub-Districts, three-fourths of the population of which, as enumerated in 1881, resided within the boundaries of Urban Districts existing in 1886.

No. II.—SCOTLAND.

BIRTHS, DEATHS, AND MARRIAGES, IN THE YEAR ENDED 31ST DECEMBER, 1896.

I.—*Serial Table:—Number of* BIRTHS, DEATHS, *and* MARRIAGES *in Scotland, and their Proportion to the Population estimated to the Middle of each Year, during each Quarter of the Years* **1896-92** *inclusive.*

	1896.		1895.		1894.		1893.		1892.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
1st Quarter—										
Births	31,033	2·98	31,781	3·10	30,776	3·03	31,351	3·11	30,311	2·99
Deaths	18,510	1·78	26,119	2·55	20,181	1·98	21,009	2·08	22,462	2·22
Marriages	7,046	0·68	6,073	0·59	6,391	0·63	6,315	0·62	7,257	0·72
Mean Temperature	40°·8		33°·1		39°·2		39°·1		36°·3	
2nd Quarter—										
Births	33,745	3·24	33,355	3·22	31,685	3·08	33,803	3·31	33,195	3·28
Deaths	17,613	1·69	19,991	1·93	17,510	1·70	19,588	1·92	18,623	1·84
Marriages	8,004	0·77	7,413	0·72	7,139	0·69	6,959	0·68	7,168	0·71
Mean Temperature	52°·1		50°·6		48°·6		52°·2		48°·4	
3rd Quarter—										
Births	32,052	3·05	31,840	3·04	30,015	2·89	31,287	3·03	30,424	2·97
Deaths	16,062	1·53	17,498	1·67	15,001	1·44	18,638	1·81	15,622	1·53
Marriages	7,493	0·71	7,191	0·69	6,480	0·62	6,675	0·65	6,684	0·65
Mean Temperature	54°·7		56°·8		54°·9		56°·3		53°·5	
4th Quarter—										
Births	32,323	3·07	29,478	2·81	31,861	3·06	30,599	2·97	31,081	3·03
Deaths	18,449	1·75	18,256	1·74	18,420	1·77	20,406	1·98	18,861	1·84
Marriages	7,713	0·73	7,703	0·74	7,551	0·73	7,141	0·69	7,528	0·74
Mean Temperature	40°·4		40°·7		43°·0		42°·3		39°·6	
Year—										
Population	4,186,849		4,155,654		4,124,691		4,093,959		4,063,451	
Births	129,153	3·08	126,454	3·04	124,337	3·01	127,040	3·10	125,011	3·08
Deaths	70,634	1·69	81,864	1·97	71,112	1·72	79,641	1·95	75,568	1·86
Marriages	30,256	0·72	28,380	0·68	27,561	0·67	27,090	0·66	28,637	0·70

II.—*Special Average Table:—Number of Births, Deaths, and Marriages in Scotland and in the Town and Country Districts for each Quarter of the Year ending 31st December,* **1896**, *and their Proportion to the Population; also the Number of Illegitimate Births, and their Proportion to the Total Births.*

Registration Groups of Districts.	Total Births.		Illegitimate Births.		Deaths.		Marriages.	
	Number.	Annual Rate per Cent.	Number.	Per Cent. of Total Births.	Number.	Annual Rate per Cent.	Number.	Annual Rate per Cent.
1st Quarter—								
SCOTLAND	31,033	2·98	2,262	7·3	18,510	1·78	7,046	0·68
Principal towns	13,437	3·19	969	7·2	8,041	1·91	3,472	0·82
Large ,, ...	4,334	3·15	256	5·9	2,486	1·80	1,009	0·73
Small ,, ...	6,585	2·97	432	6·6	3,751	1·69	1,358	0·61
Mainland rural	6,018	2·62	560	9·3	3,766	1·64	1,038	0·45
Insular ,, ...	659	2·15	45	6·8	466	1·52	169	0·55
2nd Quarter—								
SCOTLAND	33,745	3·24	2,329	6·9	17,613	1·69	8,004	0·77
Principal towns	14,512	3·45	954	6·6	7,969	1·89	4,076	0·97
Large ,, ...	4,732	3·44	277	5·9	2,339	1·70	1,042	0·76
Small ,, ...	7,285	3·28	453	6·2	3,404	1·53	1,502	0·68
Mainland rural	6,629	2·89	605	9·1	3,492	1·52	1,327	0·58
Insular ,, ...	587	1·92	40	6·8	409	1·34	57	0·19
3rd Quarter—								
SCOTLAND	32,052	3·05	2,280	7·1	16,062	1·53	7,493	0·71
Principal towns	13,511	3·17	921	6·8	7,193	1·69	4,056	0·95
Large ,, ...	4,384	3·15	275	6·3	2,065	1·48	1,055	0·76
Small ,, ...	7,030	3·13	422	6·0	3,294	1·47	1,377	0·61
Mainland rural	6,370	2·74	611	9·6	3,116	1·34	936	0·40
Insular ,, ...	757	2·45	51	6·7	394	1·27	69	0·22
4th Quarter—								
SCOTLAND	32,323	3·07	2,416	7·5	18,449	1·75	7,713	0·73
Principal towns	13,543	3·18	950	7·0	8,479	2·00	3,717	0·87
Large ,, ...	4,411	3·17	279	6·3	2,416	1·73	912	0·65
Small ,, ...	7,079	3·15	497	7·0	3,712	1·65	1,487	0·66
Mainland rural	6,499	2·80	647	10·0	3,427	1·48	1,463	0·63
Insular ,, ...	791	2·56	43	5·4	415	1·34	134	0·43

Population of Scotland.

Population.	Scotland.	Principal Towns.	Large Towns.	Small Towns.	Mainland Rural.	Insular Rural.
By Census of 1891.....	4,025,647	1,583,566	515,762	852,401	947,966	125,952
Estimated to the middle of 1896	4,186,849	1,692,955	554,033	893,214	923,501	123,146

III.—*Divisional Table:*—MARRIAGES, BIRTHS, *and* DEATHS *Registered in the Year ended 31st December*, **1896.**

(Compiled from the Registrar-General's Quarterly Returns.)

1 DIVISIONS. (Scotland)	2 AREA in Statute Acres.	3 POPULATION, 1891. (*Persons.*)	4 Marriages.	5 Births.	6 Deaths.
		No.	No.	No.	No.
SCOTLAND ..... *Totals*	19,639,377	4,025,647	30,256	129,153	70,634
I. Northern	2,261,622	118,237	478	2,500	1,600
II. North-Western.....	4,739,876	164,262	722	4,099	2,559
III. North-Eastern	2,429,594	433,199	3,209	13,392	6,876
IV. East Midland	2,790,492	630,098	4,371	17,856	10,584
V. West Midland	2,693,176	313,749	1,852	9,803	5,187
VI. South-Western.....	1,462,397	1,563,097	13,626	58,060	30,493
VII. South-Eastern	1,192,524	599,213	4,788	18,315	10,118
VIII. Southern	2,069,696	203,792	1,210	5,127	3,217

No. III.—GREAT BRITAIN AND IRELAND.

SUMMARY *of* MARRIAGES, *in the Year ended 30th September*, **1896**; *and of* BIRTHS *and* DEATHS, *in the Year ended 31st December*, **1896.**

(Compiled from the Quarterly Returns of the respective Registrars-General.)

COUNTRIES.	[000's omitted.] Area in Statute Acres.	[000's omitted.] Population, 1891. (*Persons.*)	Marriages.	Per 1,000 of Population.	Births.	Per 1,000 of Population.	Deaths.	Per 1,000 of Population.
		No.	No.	Ratio.	No.	Ratio.	No.	Ratio.
England and Wales	37,239,	29,003,	240,780	8·3	917,201	31·6	527,929	18·2
Scotland	19,639,	4,026,	30,246	7·5	129,153	32·7	70,634	17·5
Ireland	20,323,	4,705,	23,187	4·9	107,900	22·9	76,035	16·2
GREAT BRITAIN AND IRELAND	77,201,	37,734,	294,213	7·8	1,154,254	30·6	674,598	17·9

Trade of United Kingdom, 1896-95-94.—*Distribution of* **Exports*** *from United Kingdom, according to their Declared Real Value; and the Declared Real Value (Ex-duty) of* **Imports** *at Port of Entry, and therefore including Freight and Importer's Profit.*

[000's omitted.]

Merchandise (*excluding Gold and Silver*) Imported from, and Exported to, the following Foreign Countries, &c.	1896.		1895.		1894	
	Imports from	*Exports to*	Imports from	*Exports to*	Imports from	*Exports to*
I.—Foreign Countries.	£	£	£	£	£	£
Northern Europe; viz., Russia, Sweden, Norway, Denmark and Iceland	47,178,	15,235,	47,152,	14,621,	45,130,	14,363,
Central Europe; viz., Germany, Holland, and Belgium	76,097,	38,352,	72,958,	35,280,	71,533,	34,215,
Western Europe; viz., France, Portugal (with Azores, Madeira, &c.), and Spain (with Gibraltar and Canaries)	65,242,	20,312,	61,858,	19,942,	56,903,	20,013,
Southern Europe; viz., Italy, Austrian empire, Greece, Roumania, Bulgaria, & Malta	9,307,	9,782,	7,826,	9,795,	10,003,	10,178,
Levant; viz., Turkey, Asiatic and European (including Cyprus), and Egypt	14,963,	8,823,	15,276,	8,696,	14,185,	10,516,
Northern Africa; viz., Tripoli, Tunis, Algeria and Morocco	1,150,	1,074,	1,256,	1,309,	1,366,	1,191,
Western Africa	335,	971,	433,	919,	411,	889,
Eastern Africa; with African Ports on Red Sea, Aden, Arabia, Persia, Bourbon, and Kooria Mooria Islands	690,	1,951,	847,	1,372,	815,	1,339,
Indian Seas, Siam, Sumatra, Java, Philippines; other Islands	2,441,	2,866,	2,652,	2,734,	2,434,	2,749,
South Sea Islands	195,	126,	191,	102,	78,	106,
China and Japan, including Hong Kong	5,020,	14,607,	5,265,	11,790,	5,136,	9,975,
United States of America	106,376,	20,436,	86,549,	27,948,	89,608,	18,799,
Mexico and Central America	1,583,	2,787,	1,443,	2,838,	1,504,	2,210,
Foreign West Indies, Hayti, &c.	187,	1,332,	246,	1,602,	386,	1,796,
South America (Northern), New Granada, Venezuela, and Ecuador	794,	2,509,	606,	2,281,	948,	1,919,
„ (Pacific), Peru, Bolivia, Chili, and Patagonia	4,897,	3,453,	4,807,	3,928,	4,783,	2,761,
„ (Atlantic) Brazil, Uruguay, and Argentine Republic	13,341,	14,831,	13,160,	14,028,	10,376,	13,532,
Whale Fisheries; Grnlnd., Davis' Straits, Southn. Whale Fishery, Falkland Islands, and French Possessions in North America	163,	38,	145,	43,	198,	42,
Total—Foreign Countries	349,959,	159,485,	322,670,	159,228,	315,797,	146,593,
II.—British Possessions.						
British India, Ceylon, and Singapore	34,351,	33,038,	35,602,	27,667,	36,335,	32,577,
Austral. Cols.—N. So. W., Victoria & Queensld.	18,269,	13,176,	21,726,	11,323,	20,053,	10,474,
„ „ So. Aus., W. Aus., Tasm., N. Zealand, & Fiji Islands	11,143,	8,708,	11,637,	5,991,	11,806,	5,552,
British North America	16,532,	5,762,	13,401,	5,539,	12,908,	6,311,
„ W. Indies with Btsh. Guiana & Honduras	2,740,	2,870,	2,831,	2,807,	3,045,	3,074,
Cape and Natal	5,253,	13,747,	5,426,	10,581,	4,990,	8,374,
Brt. W. Co. of Af., Ascension and St. Helena	2,224,	1,848,	2,115,	1,576,	1,975,	1,713,
Mauritius	66,	306,	98,	235,	224,	273,
Channel Islands	1,334,	987,	1,184,	943,	1,212,	883,
Total—British Possessions	91,912,	80,437,	94,020,	66,662,	92,548,	69,231,
General Total £	441,871,	239,922,	416,690,	225,890,	408,345,	215,824

* *i.e.*, British and Irish produce and manufactures.

Trade of United Kingdom, for the Years 1895-91.—*Declared Value of the Total Exports of* **Foreign** *and* **Colonial** *Produce and Manufactures to each Foreign Country and British Possession.*

Merchandise Exported to the following Foreign Countries, &c.	[000's omitted.]				
	1895.	1894.	1893.	1892.	1891.
I.—Foreign Countries.	£	£	£	£	£
Northern Europe; viz., Russia, Sweden, Norway, Denmark, & Iceland	5,770,	6,771,	6,093,	5,648,	4,897,
Central Europe; viz., Germany, Holland and Belgium	20,664,	21,923,	22,641,	24,724,	22,564,
Western Europe; viz., France, Portugal (with Azores, Madeira, &c.), and Spain (with Gibraltar and Canaries)	7,398,	7,189,	7,582,	7,723,	8,940,
Southern Europe; viz., Italy, Austrian Empire, Greece, Ionian Islands, and Malta	1,259,	1,305,	1,367,	1,309,	1,153,
Levant; viz., Turkey, Roumania, Syria and Palestine, and Egypt	404,	554,	558,	670,	694,
Northern Africa; viz., Tripoli, Tunis, Algeria, and Morocco	151,	109,	126,	129,	145,
Western Africa	74,	84,	89,	86,	106,
Eastern Africa; with African Ports on Red Sea, Aden, Arabia, Persia, Bourbon, and Kooria Mooria Islands	13,	20,	17,	22,	—
Indian Seas, Siam, Sumatra, Java, Philippines; other Islands	55,	62,	91,	69,	52,
South Sea Islands	—	—	—	—	—
China, including Hong Kong and Japan	392,	517,	446,	523,	448,
United States of America	16,120,	11,976,	11,758,	14,865,	13,522,
Mexico and Central America	197,	140,	136,	197,	321,
Foreign West Indies and Hayti	758,	884,	983,	1,316,	1,024,
South America (Northern), New Granada, Venezuela and Ecuador	60,	67,	77,	134,	116,
„ (Pacific), Peru, Bolivia, Chili, and Patagonia	290,	238,	290,	394,	293,
„ (Atlantic), Brazil, Uruguay, and Argentine Confed.	489,	458,	453,	501,	464,
Other countries (unenumerated)	107,	87,	80,	81,	181,
Total—Foreign Countries	54,201,	52,384,	52,787,	58,391,	54,920
II.—British Possessions.					
British India, Ceylon, and Singapore	881,	927,	1,295,	1,303,	1,542,
Austral. Cols.—New South Wales and Victoria, So. Aus., W. Aus., Tasm., and N. Zealand	2,034,	1,943,	1,897,	2,247,	2,756,
British North America	1,056,	1,070,	1,361,	1,101,	1,054,
„ W. Indies with Btsh. Guiana & Honduras	412,	475,	447,	378,	458,
Cape and Natal	882,	663,	771,	665,	681,
Brt. W. Co. of Af., Ascension and St. Helena	203,	232,	213,	213,	181,
Mauritius	26,	26,	36,	21,	20,
Channel Islands	211,	209,	203,	210,	216,
Other possessions	36,	33,	33,	34,	51,
Total—British Possessions	5,741,	5,578,	6,256,	6,172,	6,959,
General Total £	59,942,	57,962,	59,043,	64,563,	61,879,

IMPORTS.—(United Kingdom.)—**For the Years 1896-95-94-93-92.**—*Declared Real Value (Ex-duty), at Port of Entry (and therefore including Freight and Importer's Profit), of Articles of Foreign and Colonial Merchandise Imported into the United Kingdom.*

[000's omitted.]

Foreign Articles Imported.		1896.	1895.	1894.	1893.	1892.
		£	£	£	£	£
Raw Matls.–*Textile*, &c.	Cotton, Raw ...	36,272,	30,429,	32,944,	30,685,	37,888,
	Wool	26,913,	28,427,	26,512,	26,323,	28,451,
	Silk*	19,647,	17,121,	14,606,	14,064,	13,367,
	Flax	3,117,	3,271,	2,525,	2,518,	2,743,
	Hemp and Jute	6,120,	6,446,	6,520,	5,788,	6,354,
	Indigo	1,534,	1,393,	1,149,	1,389,	1,357,
		93,603,	87,087,	84,256,	80,767,	90,160,
,, ,,	*Various.* Hides	2,225,	2,804,	2,231,	2,181,	2,085,
	Oils	2,434,	2,572,	2,906,	2,703,	2,539,
	Metals	18,239,	16,549,	17,083,	18,939,	19,320,
	Tallow	2,179,	2,575,	2,345,	2,162,	1,748,
	Timber	19,402,	15,743,	17,151,	15,387,	17,152,
		44,479,	40,243,	41,716,	41,372,	42,844,
,, ,,	*Agricltl.* Guano	105,	392,	146,	95,	189,
	Seeds	6,736,	6,279,	7,138,	7,020,	7,044,
		6,841,	6,671,	7,284,	7,115,	7,233,
Tropical, &c., Produce.	Tea	10,651,	10,243,	9,765,	10,125,	10,047,
	Coffee and Chic...	3,628,	3,835,	3,588,	4,049,	3,990,
	Sugar & Molasses	18,553,	17,897,	19,399,	22,239,	19,949,
	Tobacco	4,371,	3,354,	3,472,	3,549,	3,538,
	Rice	1,688,	1,982,	1,979,	2,140,	2,789,
	Fruits	7,140,	6,527,	7,266,	6,014,	7,148,
	Wines	5,951,	5,448,	5,018,	5,302,	6,020,
	Spirits	1,895,	1,823,	2,133,	1,899,	2,187,
		53,877,	51,109,	52,620,	55,317,	55,668,
Food	Grain and Meal.	52,793,	49,723,	48,220,	51,180,	58,733,
	Provisions	57,161,	55,164,	53,893,	53,270,	52,232,
		109,954,	104,887,	102,113,	104,450,	110,965,
Remainder of Enumerated Articles		82,627,	78,930,	73,600,	69,537,	71,574,
Total Enumerated Imports		391,381,	368,927,	361,589,	358,558,	378,444,
Add for Unenumerated Imports (say)		50,426,	47,763,	46,755,	46,130,	45,350,
Total Imports		441,807,	416,690,	408,344,	404,688,	423,794,

* "Silk," inclusive of manufactured silk, "not made up."

EXPORTS.—(United Kingdom.)—**For the Years 1896-95-94-93-92.**—*Declared Real Value, at Port of Shipment, of Articles of* British *and* Irish *Produce and Manufactures Exported from the United Kingdom.*

[000's omitted.]

British Produce, &c., Exported.		1896.	1895.	1894.	1893.	1892.
		£	£	£	£	£
Manfrs.—*Textile.*	Cotton Manufactures ..	59,334,	54,455,	57,279,	54,699,	56,266,
	,, Yarn	10,048,	9,291,	9,286,	9,055,	9,693,
	Woollen Manufactures	18,267,	19,738,	14,011,	16,404,	17,907,
	,, Yarn	7,222,	7,259,	5,972,	6,027,	5,276,
	Silk Manufactures.....	1,422,	1,435,	1,222,	1,515,	1,655,
	,, Yarn	265,	296,	342,	383,	323,
	Linen Manufactures	5,031,	5,351,	4,505,	4,775,	5,166,
	,, Yarn	1,042,	966,	939,	1,005,	890,
		102,631,	98,791,	93,556,	93,863,	97,176,
,, *Sewed.*	Apparel	5,228,	4,525,	4,123,	4,260,	4,847,
	Haberdy. and Mllnry.	1,518,	1,353,	1,247,	1,492,	1,758,
		6,746,	5,878,	5,370,	5,752,	6,605,
Metals, &c.	Hardware	2,121,	1,856,	1,835,	2,047,	2,195,
	Machinery	17,037,	15,151,	14,205,	13,917,	13,887,
	Iron	23,813,	19,681,	18,689,	20,593,	21,766,
	Copper and Brass.....	3,037,	3,238,	2,772,	3,480,	4,218,
	Lead and Tin	922,	877,	950,	1,159,	1,253,
	Coals and Culm	15,161,	15,434,	17,371,	14,375,	16,811,
		62,091,	56,237,	55,822,	55,571,	60,130,
Ceramic Manufcts.	Earthenware and Glass	2,861,	2,782,	2,474,	2,751,	2,942,
Indigenous Mnfrs. and Products.	Beer and Ale.....	1,591,	1,524,	1,463,	1,509,	1,652,
	Butter	80,	102,	98,	86,	82,
	Cheese	37,	38,	40,	44,	45,
	Candles	357,	386,	331,	353,	344,
	Salt.....	471,	546,	604,	504,	539,
	Spirits	1,779,	1,560,	1,378,	1,196,	1,367,
		4,315,	4,156,	3,914,	3,692,	4,029,
Various Manufcts.	Books, Printed	1,308,	1,228,	1,218,	1,262,	1,290,
	Furniture	595,	517,	419,	521,	533,
	Leather Manufactures	3,474,	3,359,	3,124,	3,392,	3,758,
	Soap	745,	757,	621,	644,	586,
	Plate and Watches	390,	346,	301,	301,	322,
	Stationery	958,	860,	797,	816,	865,
		7,470,	7,067,	6,480,	6,936,	7,354,
Remainder of Enumerated Articles		38,315,	36,573,	34,733,	35,528,	35,358,
Unenumerated Articles.....		15,493,	14,406,	13,475,	14,002,	13,483,
Total Exports.....		239,922,	225,890,	215,824,	218,095,	227,077,

SHIPPING.—(United Kingdom.)—*Account of Tonnage of Vessels Entered and Cleared with Cargoes, from and to Various Countries, during the* **Years** *ended December,* **1896-95-94.**

Countries from whence Entered and to which Cleared.	Total British and Foreign.					
	1896.		1895.		1894.	
	Entered.	Cleared.	Entered.	Cleared.	Entered.	Cleared.
FOREIGN COUNTRIES.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Russia { Northern ports	1,808,101	1,422,206	1,762,777	1,376,973	1,756,436	1,451,504
Russia { Southern „	844,667	167,435	1,187,177	157,138	1,310,531	214,770
Sweden	1,771,171	1,468,781	1,640,714	1,385,037	1,688,383	1,416,269
Norway	1,294,848	1,016,192	1,176,770	1,018,052	1,211,365	944,554
Denmark	391,346	1,280,620	329,929	1,257,111	345,058	1,143,685
Germany	2,043,491	3,973,108	2,043,366	3,808,716	2,014,221	3,631,128
Holland	2,377,889	2,184,900	2,202,069	1,981,952	2,185,165	1,991,069
Belgium	1,780,683	1,765,574	1,711,738	1,640,702	1,697,728	1,521,238
France	2,522,416	4,194,015	2,318,490	3,998,153	2,287,432	3,872,900
Spain	3,224,741	1,461,755	2,750,704	1,412,097	2,773,225	1,381,314
Portugal	130,110	432,075	111,899	413,198	143,105	436,161
Italy	233,323	2,440,117	201,530	2,538,004	204,146	2,696,027
Austrian territories	81,963	197,231	86,060	198,379	93,179	181,194
Greece	198,912	180,799	168,456	178,455	147,597	184,180
Turkey	335,234	444,945	364,570	457,590	261,118	461,053
Roumania	282,587	216,962	213,782	219,325	418,375	218,543
Egypt	389,174	1,048,064	412,637	938,995	412,965	946,792
United States of America	6,431,303	4,042,091	5,439,748	3,832,652	5,522,133	3,849,392
Mexico, Foreign West Indies, and Central America	88,659	388,056	61,180	375,851	72,396	364,832
Brazil	190,140	1,017,410	158,590	931,110	156,207	915,006
Peru	51,536	63,716	60,600	56,952	65,156	72,961
Chili	256,807	341,781	228,804	414,352	227,628	379,559
Argentine Republic	1,179,492	788,840	1,138,366	695,375	717,755	689,351
China	87,799	81,077	114,445	67,604	131,703	85,594
Other countries	681,073	1,493,408	672,212	1,334,279	648,434	1,223,189
Total, Foreign Countries	28,677,465	32,111,158	26,556,613	30,688,052	26,491,441	30,272,265
BRITISH POSSESSIONS.						
North American Colonies	1,696,142	850,821	1,428,710	796,589	1,449,626	765,424
East Indies, including Ceylon, Singapore, and Mauritius	1,248,637	1,707,499	1,395,151	1,938,878	1,343,966	1,948,197
Australia and New Zealand	818,564	843,525	952,212	817,247	849,872	821,296
West Indies	104,457	231,254	106,599	245,411	118,974	246,269
Channel Islands	402,101	329,519	360,248	302,395	384,571	313,402
Other possessions	532,226	1,629,441	558,640	1,483,914	499,676	1,410,879
Total, British Possessions	4,802,127	5,592,059	4,801,560	5,584,434	4,649,685	5,505,467
TOTAL FOREIGN COUNTRIES AND BRITISH POSSESSIONS.						
Twelve Months ended December, 1896	33,479,592	37,703,217	—	—	—	—
Twelve Months ended December, '95	—	—	31,358,173	36,272,486	—	—
Twelve Months ended December, '94	—	—	—	—	31,141,126	35,777,732

GOLD AND SILVER BULLION AND SPECIE.—(United Kingdom.) —*Declared Real Value of,* IMPORTED AND EXPORTED *for the* **Years 1896-95-94.**

[000's omitted.]

Countries.	1896.		1895.		1894.	
	Gold.	*Silver.*	Gold.	*Silver.*	Gold.	*Silver.*
Imported from—	£	£	£	£	£	£
Australasia	4,606,	158,	5,865,	107	4,853,	139,
S. America, Brazil, Mexico, W. Indies	2,702,	1,702,	1,667,	1,286,	1,592,	1,739,
United States	3,171,	10,141,	11,132,	8,083,	3,247,	7,247,
	10,479,	12,001,	18,664,	9,476,	9,692,	9,125,
France	756,	1,741,	1,334,	612,	1,008,	733,
Germany, Holland, Belg., and Sweden	1,605,	261,	2,065,	354,	1,448,	491,
Portugal, Spain, and Gibraltar	859,	32,	601,	40,	941,	32,
Malta and Egypt	255,	128,	1,234,	66,	1,084,	30,
China, with Hong Kong and Japan	1,027,	72,	1,403,	1,	2,430,	40,
West Coast of Africa	205,	57,	172,	34,	158,	86,
British Possessions in South Africa	8,003,	13,	8,354,	50,	7,364,	71,
All other Countries	1,279,	24,	2,079,	37,	3,447,	397,
Totals Imported	24,468,	14,329,	36,006,	10,670,	27,572,	11,005,
Exported to—						
France	2,425,	2,915,	1,292,	1,458,	6,471,	501,
Germany, Holland, Belg. & Sweden	6,285,	647,	1,862,	333,	5,826,	881,
Portugal, Spain, and Gibraltar	93,	335,	181,	31,	385,	24,
	8,803,	3,897,	3,335,	1,822,	12,682,	1,406,
B. India, China, Hong Kong and Japan	2,952,	6,857,	1,429,	6,485,	434,	10,041,
United States	10,528,	7,	3,318,	8,	300,	2,
South Africa	820.	166,	5,620,	76,	235,	109,
S. America, Brazil, Mexico, W. Indies	2,105,	92,	5,108,	262,	1,203,	203,
All other Countries	4,916,	3,989,	2,459,	1,714,	794,	404,
Totals Exported	30,124,	15,048,	21,269,	10,367,	15,648,	12,165,
Excess of imports	—	—	14,737,	303,	11,933,	—
„ exports	5,656,	719,	—	—	—	1,160,

BRITISH CORN.—*Gazette Average Prices* (ENGLAND AND WALES), *Weekly for* 1896.

Weeks ended on Saturday.	Weekly Average. (Per Imperial Quarter.)			Weeks ended on Saturday.	Weekly Average. (Per Imperial Quarter.)		
	Wheat.	Barley.	Oats.		Wheat.	Barley.	Oats.
1896.	*s.* *d.*	*s.* *d.*	*s.* *d.*	1896.	*s.* *d.*	*s.* *d.*	*s.* *d.*
Jan. 4	25 2	24 7	13 10	July 4	24 9	16 2	15 –
„ 11	25 4	23 11	13 9	„ 11	24 7	18 11	14 9
„ 18	25 10	23 6	13 11	„ 18	24 2	18 3	15 4
„ 25	26 1	23 7	13 10	„ 25	24 –	19 8	15 –
Feb. 1	26 3	23 1	14 1	Aug. 1	23 8	19 7	14 10
„ 8	26 4	22 5	14 –	„ 8	23 6	19 5	14 9
„ 15	26 7	21 11	14 –	„ 15	22 11	21 1	14 6
„ 22	26 3	21 10	13 9	„ 22	22 4	21 11	14 3
„ 29	25 6	21 10	13 10	„ 29	22 5	21 10	13 7
March 7	25 4	21 5	13 8	Sept. 5	23 1	21 11	13 11
„ 14	25 5	21 3	13 10	„ 12	23 9	23 4	14 1
„ 21	25 1	21 1	13 9	„ 19	24 –	24 8	14 6
„ 28	24 10	21 4	13 4	„ 26	24 4	26 3	14 1
April 4	24 7	21 10	13 3	Oct. 3	25 2	28 7	14 9
„ 11	24 6	21 –	13 1	„ 10	26 7	29 5	15 3
„ 18	24 11	23 6	14 –	„ 17	27 10	29 7	15 9
„ 25	25 6	21 –	13 11	„ 24	28 11	28 6	16 –
				„ 31	30 9	28 3	17 3
May 2	25 8	22 6	14 3				
„ 9	25 7	21 –	14 4	Nov. 7	31 6	27 5	17 6
„ 16	25 7	21 –	14 5	„ 14	31 9	27 3	17 7
„ 23	25 6	21 8	14 6	„ 21	32 11	26 8	17 7
„ 30	25 4	21 5	14 10	„ 28	33 4	26 9	17 7
June 6	25 5	21 6	14 8	Dec. 5	32 8	26 2	17 –
„ 13	25 1	19 3	14 9	„ 12	32 2	25 4	16 8
„ 20	25 1	22 8	15 1	„ 19	31 3	24 10	16 7
„ 27	24 10	19 5	14 10	„ 26	30 9	24 1	16 1

BRITISH CORN.—*Gazette Average Prices* (ENGLAND AND WALES), *Summary of, for* **1896**, *with those for* **1895** *added for Comparison.*

Average for	Per Imperial Quarter, 1896.						Per Imperial Quarter, 1895.					
	Wheat.		Barley.		Oats.		Wheat.		Barley.		Oats.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
January	25	7	23	10	13	10	20	7	21	6	13	11
February	26	2	22	2	13	11	20	–	21	9	13	8
March	25	2	21	3	13	7	19	11	21	3	13	10
First quarter	25	8	22	5	13	9	20	2	21	6	13	10
April	24	10	21	10	13	6	20	5	21	–	14	2
May	25	6	21	6	14	5	22	5	20	5	15	2
June	25	1	20	8	14	10	25	9	19	7	16	–
Second quarter	25	2	21	4	14	3	22	10	20	4	15	1
July	24	4	18	3	15	–	24	9	19	8	16	1
August	22	11	20	9	14	4	24	2	20	3	15	7
September	23	9	24	–	14	1	22	10	24	–	13	7
Third quarter	23	8	21	–	14	6	23	11	21	4	15	1
October	27	10	28	10	15	9	24	6	25	5	13	5
November	32	4	27	–	17	6	25	9	25	1	14	2
December	31	8	25	1	16	7	24	11	23	11	13	11
Fourth quarter	30	7	27	–	16	7	25	1	24	10	13	10
THE YEAR	26	3	22	11	14	9	23	–	22	–	14	5

BANK OF ENGLAND.

Pursuant to the Act 7th and 8th Victoria, cap. 32 (1844)

[0,000's omitted.]

1	2	3	4	5	6	7
		Issue Department.			Collateral Columns.	
Liabilities.		Assets.				
Notes Issued.	Dates. (Wednesdays.)	Government Debt.	Other Securities.	Gold Coin and Bullion.	Notes in Hands of Public. (Col. 1 minus col. 16.)	Minimum Rates of Discount at Bank of England.
£ Mlns.	1899.	£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.	Per cnt.
59,77	Jan. 1	11,02	5,78	42,97	26,47	2
60,19	„ 8	11,02	5,78	43,39	25,98	
60,62	„ 15	11,02	5,78	43,82	25,78	
62,19	„ 22	11,02	5,78	45,39	25,32	
62,92	„ 29	11,02	5,78	46,12	25,29	
62,99	Feb. 5	11,02	5,78	46,19	25,45	
62,47	„ 12	11,02	5,78	45,67	24,97	
63,10	„ 19	11,02	5,78	46,30	24,85	
63,41	„ 26	11,02	5,78	46,61	24,92	
63,18	Mar. 4	11,02	5,78	46,38	25,37	
63,11	„ 11	11,02	5,78	46,31	25,03	
63,34	„ 18	11,02	5,78	46,54	25,02	
62,97	„ 25	11,02	5,78	46,17	25,38	
61,39	April 1	11,02	5,78	44,59	26,73	
61,15	„ 8	11,02	5,78	44,35	26,53	
61,67	„ 15	11,02	5,78	44,87	26,20	
62,06	„ 22	11,02	5,78	45,26	26,04	
61,81	„ 29	11,02	5,78	45,01	26,30	
61,36	May 6	11,02	5,78	44,56	26,25	
61,37	„ 13	11,02	5,78	44,57	26,19	
61,49	„ 20	11,02	5,78	44,69	26,08	
61,53	„ 27	11,02	5,78	44,73	25,96	
62,11	June 3	11,02	5,78	45,31	26,36	
62,65	„ 10	11,02	5,78	45,85	26,55	
63,40	„ 17	11,02	5,78	46,60	26,54	
63,59	„ 24	11,02	5,78	46,79	27,04	
62,93	July 1	11,02	5,78	46,13	27,96	
62,32	„ 8	11,02	5,78	45,52	27,61	
62,65	„ 15	11,02	5,78	45,85	27,38	
62,63	„ 22	11,02	5,78	45,83	27,30	
62,47	„ 29	11,02	5,78	45,67	27,42	
61,77	Aug. 5	11,02	5,78	44,97	27,82	
61,78	„ 12	11,02	5,78	44,98	27,47	
62,05	„ 19	11,02	5,78	45,25	27,33	
60,94	„ 26	11,02	5,78	44,14	27,28	
58,72	Sept. 2	11,02	5,78	41,92	27,53	
57,37	„ 9	11,02	5,78	40,58	27,14	2½
56,84	„ 16	11,02	5,78	40,04	26,84	
55,82	„ 23	11,02	5,78	39,02	26,67	3
54,98	„ 30	11,02	5,78	38,18	28,03	
54,11	Oct. 7	11,02	5,78	37,31	28,17	
52,32	„ 14	11,02	5,78	35,52	27,63	
50,83	„ 21	11,02	5,78	34,03	26,97	4
50,75	„ 28	11,02	5,78	33,95	26,71	
50,13	Nov. 4	11,02	5,78	33,33	27,13	
49,73	„ 11	11,02	5,78	32,93	26,54	
49,99	„ 18	11,02	5,78	33,19	27,24	
50,27	„ 25	11,02	5,78	33,47	26,07	
49,86	Dec. 2	11,02	5,78	33,06	26,16	
50,08	„ 9	11,02	5,78	33,28	25,87	
49,88	„ 16	11,02	5,78	33,08	26,03	
48,52	„ 23	11,02	5,78	31,72	26,55	
48,94	„ 30	11,02	5,78	32,14	26,67	

—Weekly Return.

for Wednesday in each Week, during the Year **1896.**

[0,000's omitted.]

8	9	10	11	12	13	14	15	16	17	18
Banking Department.										
Liabilities.						Assets.				
Capital and Rest.		Deposits.		Seven Day and other Bills.	Dates. (Wednesdys.)	Securities.		Reserve.		Totals of Liabilities and Assets.
Capital.	Rest.	Public.	Private.			Government.	Other.	Notes.	Gold and Silver Coin.	
£ Mlns	£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.	1896.	£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.	£ Mlns.
14,55	3,11	9,93	56,53	,09	Jan. 1	14,94	33,99	33,30	1,99	84,21
14,55	3,30	7,23	52,79	,12	„ 8	14,68	26,96	34,21	2,14	78,00
14,55	3,35	8,52	52,20	,15	„ 15	14,68	27,02	34,84	2,24	78,78
14,55	3,38	9,69	52,85	,12	„ 22	14,68	26,73	36,87	2,31	80,59
14,55	3,38	10,59	52,37	,12	„ 29	14,68	26,49	37,63	2,19	81,01
14,55	3,40	11,80	51,05	,17	Feb. 5	14,47	26,55	37,54	2,41	80,97
14,55	3,41	13,84	49,01	,15	„ 12	14,57	26,45	37,50	2,45	80,96
14,55	3,42	16,40	47,83	,16	„ 19	14,57	27,05	38,25	2,50	82,37
14,55	3,40	17,01	47,51	,15	„ 26	14,57	27,06	38,49	2,51	82,63
14,55	3,64	18,01	47,12	,17	Mar. 4	15,16	27,96	37,81	2,57	83,50
14,55	3,64	18,63	46,26	,16	„ 11	15,16	27,45	38,08	2,56	83,25
14,55	3,67	19,17	46,12	,14	„ 18	15,16	27,60	38,32	2,57	83,65
14,55	3,67	18,72	45,75	,11	„ 25	15,15	27,53	37,59	2,54	82,80
14,55	3,67	17,21	45,33	,13	April 1	15,21	28,55	34,66	2,47	80,89
14,55	3,11	13,74	48,91	,13	„ 8	15,21	28,08	34,62	2,53	80,44
14,55	3,12	13,07	50,31	,14	„ 15	15,21	27,95	35,47	2,58	81,20
14,55	3,13	14,04	50,14	,14	„ 22	15,21	28,16	36,02	2,61	82,00
14,55	3,13	14,15	49,56	,15	„ 29	15,26	28,16	35,51	2,61	81,54
14,55	3,12	13,70	49,97	,15	May 6	15,26	28,57	35,11	2,56	81,50
14,55	3,13	14,15	49,44	,16	„ 13	15,26	28,50	35,18	2,49	81,43
14,55	3,13	15,64	49,26	,17	„ 20	15,26	29,50	35,41	2,58	82,75
14,55	3,13	15,23	48,79	,14	„ 27	15,26	28,51	35,57	2,49	81,84
14,55	3,08	14,45	49,89	,14	June 3	15,26	28,58	35,75	2,53	82,11
14,55	3,08	14,09	50,49	,15	„ 10	15,26	28,53	36,10	2,49	82,37
14,55	3,09	13,15	52,33	,16	„ 17	15,21	28,73	36,86	2,47	83,28
14,55	3,09	13,18	52,25	,13	„ 24	15,23	29,05	36,55	2,37	83,20
14,55	3,12	10,76	57,73	,11	July 1	15,27	33,68	34,97	2,36	86,27
14,55	3,31	7,58	55,58	,15	„ 8	14,96	29,13	34,71	2,37	81,18
14,55	3,32	6,95	56,45	,15	„ 15	14,96	28,86	35,26	2,34	81,42
14,55	3,34	7,66	55,71	,12	„ 22	14,96	28,67	35,33	2,42	81,39
14,55	3,36	7,17	55,45	,12	„ 29	14,96	28,43	35,04	2,21	80,65
14,55	3,39	6,19	55,37	,15	Aug. 5	14,96	28,57	33,95	2,17	79,65
14,55	3,39	6,22	55,69	,14	„ 12	14,96	28,57	34,31	2,15	79,99
14,55	3,41	7,44	55,10	,13	„ 19	14,96	28,74	34,72	2,22	80,64
14,55	3,41	7,14	53,93	,13	„ 26	14,96	28,32	33,66	2,23	79,17
14,55	3,65	6,98	51,38	,16	Sept. 2	14,94	28,45	31,19	2,13	76,71
14,55	3,65	7,02	50,35	,15	„ 9	14,94	28,39	30,23	2,15	75,71
14,55	3,65	6,82	50,26	,12	„ 16	14,94	28,35	30,00	2,11	75,40
14,55	3,68	8,08	48,23	,12	„ 23	14,94	28,43	29,15	2,14	74,67
14,55	3,67	7,75	48,04	,13	„ 30	14,94	30,04	26,95	2,20	74,13
14,55	3,13	6,81	48,57	,16	Oct. 7	16,94	28,14	25,94	2,20	73,22
14,55	3,13	5,42	47,71	,13	„ 14	16,18	27,99	24,69	2,08	70,94
14,55	3,16	5,33	45,81	,13	„ 21	14,66	28,40	23,86	2,06	68,98
14,55	3,16	5,75	43,61	,13	„ 28	14,05	26,88	24,04	2,24	67,20
14,55	3,16	5,05	43,83	,13	Nov. 4	13,65	27,61	23,00	2,47	66,73
14,55	3,17	5,39	43,51	,18	„ 11	13,76	27,33	23,19	2,53	66,81
14,55	3,19	6,39	43,40	,14	„ 18	13,75	27,69	23,75	2,49	67,68
14,55	3,19	6,86	43,02	,14	„ 25	13,75	27,22	24,20	2,58	67,76
14,55	3,15	6,13	42,45	,15	Dec. 2	13,75	26,45	23,70	2,52	66,43
14,55	3,15	6,60	42,47	,14	„ 9	13,75	26,55	24,21	2,41	66,92
14,55	3,17	6,83	42,21	,13	„ 16	13,75	27,14	23,85	2,15	66,89
14,55	3,18	8,12	41,47	,15	„ 23	13,75	29,65	21,98	2,09	67,47
14,55	3,19	8,38	46,35	,13	„ 30	13,75	34,56	22,27	2,02	72,61

REVENUE OF THE UNITED KINGDOM.

Net Produce in QUARTERS *and* YEARS *ended* 31*st* DEC., **1896-95-94-93**

[000's omitted.]

QUARTERS, ended 31st Dec.	1896.	1895.	1896.		Corresponding Quarters.	
			Less.	More.	1894.	1893.
	£	£	£	£	£	£
Customs	6,151,*	5,874,*	—	277,	5,622,*	5,518,*
Excise	7,950,*	7,920,*	—	30,	7,680,*	7,200,*
Stamps and estate, &c., duties	4,580,*	5,120,*	540,	—	3,880,*	3,160,*
Taxes	40,	40,	—	—	25,	30,
Post Office	3,030,	2,935,	—	95,	2,730,	2,670,
Telegraph Service	715,	705,	—	10,	615,	620,
	22,466,	22,594,	540,	412,	20,552,	19,198,
Property Tax	1,460,	1,390,	—	70,	1,340,	1,240,
	23,926,	23,984,	540,	482,	21,892,	20,438,
Crown Lands	160,	160,	—	—	160,	160,
Interest on Advances	—	—	—	—	9,	109,
Miscellaneous	468,	457,	—	11,	387,	501,
Totals	24,554,	24,601,	540,	493,	22,448,	21,208,
			NET DECR. £47,			

YEARS, ended 31st Dec.	1896.	1895.	1896.		Corresponding Years.	
			Less.	More.	1894.	1893.
	£	£	£	£	£	£
Customs	21,189,*	20,624,*	—	565,	20,050,*	19,508,*
Excise	27,240,*	26,660,*	—	580,	25,980,*	25,030,*
Stamps and estate, &c., duties	18,550,*	18,378,*	—	172,	13,972,*	12,730,*
Taxes	2,520,	2,495,	—	25,	2,482,	2,433,
Post Office	11,640,	11,130,	—	510,	10,570,	10,470,
Telegraph Service	2,895,	2,765,	—	130,	2,570,	2,510,
	84,034,	82,052,	—	1,982,	75,624,	72,681,
Property Tax	16,300,	15,972,	—	328,	15,628,	13,640,
	100,334,	98,024,	—	2,310,	91,252,	86,321,
Crown Lands	415,	410,	—	5,	420,	430,
Interest on Advances	710,	690,	—	20,	134,	219,
Miscellaneous	1,799,	1,630,	—	169,	2,197,	1,583,
Totals	103,258,	100,754,	—	2,504,	94,003,	88,553,
			NET INCR. £2,504,			

* Exclusive of transfers to local taxation account.

LONDON CLEARING; CIRCULATION, PRIVATE AND PROVINCIAL.

The London Clearing, and the Average Amount of Promissory Notes in Circulation in England *and* Wales *on Saturday in each Week during the Year* **1896**; *and in* Scotland *and* Ireland, *at the Dates, as under.*

[0,000's omitted.]

England and Wales.					Scotland.				Ireland.		
Dates. *Saturday.*	*London:* Cleared in each Week on the preceding *Wednesday.*	Private Banks. (Fixed Issues, Dec., 1,54).	Joint Stock Banks. (Fixed Issues, Dec., 1,95).	Total. (Fixed Issues, Dec., 3,49).	Average for Four Weeks ending	£5 and upwards.	Under £5.	Total. (Fixed Issues, Dec., 2,68).	£5 and upwards	Under £5.	Total. (Fixed Issues, Dec., 6,35).
1896.	£	£	£	£	1895.	£	£	£	£	£	£
					Dec. 28...	2,39	4,94	7,33	3,69	2,77	6,46
Jan. 4.....	178,98	69	1,04	1,73							
„ 11.....	142,75	69	1,04	1,73							
„ 18.....	128,30	68	1,04	1,71	1896.						
„ 25.....	163,11	66	1,02	1,68	Jan. 25...	2,19	4,56	6,75	3,56	2,66	6,22
Feb. 1.....	116,37	65	1,02	1,67							
„ 8.....	178,08	66	1,02	1,68							
„ 15.....	123,47	65	1,02	1,67							
„ 22.....	166,67	63	1,01	1,64	Feb. 22..	2,11	4,49	6,60	3,56	2,59	6,15
„ 29.....	118,68	63	1,02	1,65							
Mar. 7.....	190,04	64	1,02	1,66							
„ 14.....	119,17	63	1,02	1,66							
„ 21.....	165,12	63	1,03	1,66	Mar. 21...	2,07	4,50	6,57	3,56	2,52	6,08
„ 28.....	115,75	65	1,05	1,70							
April 4.....	176,12	68	1,09	1,77							
„ 11.....	102,63	69	1,10	1,79							
„ 18.....	142,43	67	1,10	1,77	April 18...	2,10	4,65	6,75	3,79	2,61	6,40
„ 25.....	132,20	66	1,09	1,76							
May 2.....	146,69	67	1,12	1,79							
„ 9.....	161,14	67	1,13	1,80							
„ 16.....	135,24	67	1,13	1,80	May 16...	2,39	4,96	7,35	3,94	2,64	6,58
„ 23.....	172,39	66	1,11	1,76							
„ 30.....	105,81	65	1,08	1,73							
June 6.....	176,20	64	1,07	1,71							
„ 13.....	121,03	63	1,05	1,68	June 13...	2,63	5,10	7,73	3,63	2,56	6,19
„ 20.....	168,67	62	1,03	1,65							
„ 27.....	124,80	63	1,02	1,65							
July 4.....	213,36	64	1,04	1,68							
„ 11.....	146,27	57	1,03	1,60	July 11...	2,35	4,97	7,32	3,45	2,47	5,92
„ 18.....	161,41	56	1,01	1,57							
„ 25.....	142,73	55	99	1,54							
Aug. 1.....	124,71	45	99	1,44							
„ 8.....	161,64	44	99	1,43	Aug. 8...	2,26	4,96	7,22	3,46	2,47	5,93
„ 15.....	124,39	42	98	1,40							
„ 22.....	155,39	42	96	1,38							
„ 29.....	115,15	42	96	1,38							
Sept. 5.....	150,78	42	97	1,39	Sept. 5...	2,25	4,93	7,18	3,40	2,54	5,94
„ 12.....	113,12	42	96	1,38							
„ 19.....	137,62	42	97	1,39							
„ 26.....	123,30	42	98	1,41							
Oct. 3.....	150,94	46	1,04	1,50	Oct. 3...	2,20	4,97	7,17	3,54	2,69	6,23
„ 10.....	152,72	47	1,07	1,54							
„ 17.....	124,54	47	1,06	1,53							
„ 24.....	167,59	47	1,05	1,51							
„ 31.....	131,74	46	1,05	1,52	„ 31...	2,24	5,07	7,31	3,94	2,92	6,86
Nov. 7.....	169,89	47	1,09	1,56							
„ 14.....	139,91	47	1,08	1,55							
„ 21.....	165,12	47	1,09	1,56							
„ 28.....	123,01	48	1,08	1,56	Nov. 28...	2,54	5,29	7,83	3,90	2,90	6,80
Dec. 5.....	166,12	47	1,05	1,52							
„ 12.....	124,46	46	1,02	1,48							
„ 19.....	165,73	45	1,02	1,47							
„ 26.....	133,20	45	1,01	1,46	Dec. 26...	2,37	5,11	7,48	3,62	2,79	6 41

FOREIGN EXCHANGES.—*Quotations as under,* LONDON *on Paris, Hamburg, Calcutta;—and New York and Hong Kong, on* LONDON, *for* **1896.**

1	2	3	4	5	6	7	8	9
			Calcutta.				Price per Ounce.	
DATES. (Tuesdays and nearest Dates).	London on Paris. 3 m. d.	London on Hamburg. 3 m. d.	London on Calcutta.	Indian Council Bills. Minimum Price per Rupee.*	New York on London. 60 d. s.†	Hong Kong on London. 4 m. d.‡	Gold Bars (Fine).	Standard Silver in Bars.
1896.			*s. d.*	*d.*	Per cnt.	*s. d.*	*s. d.*	*d.*
Jan. 7	25·36¼	20·62	1 1 5/16	13 1 5/16	4·87½	2 1¾	77 9	30 9/16
„ 21	25·36¼	20·62	1 1 5/16	13 3 1/32	4·87¾	2 1¾	77 9	30⅝
Feb. 4 ...	25·33¾	20·60	1 2	14 3/32	4·87	2 2	77 9	30 13/16
„ 18	25·35	20·60	1 2¼	14 3/32	4·86½	2 2¼	77 9¼	30⅞
Mar. 3	25·35	20·59	1 2 7/32	14 13/16	4·87	2 2⅝	77 9⅝	31¼
„ 17	25·35	20·58	1 2½	14½	4·87	2 2½	77 9¾	31 7/16
„ 31 ...	25·20	20·59	1 2 5/16	14 1/32	4·87¾	2 2⅝	77 9¼	31¼
Apl. 14	25·16¼	20·57	1 2 3/16	14 1/32	4·87¾	2 2⅜	77 9	30 13/16
„ 28	25·30	20·58	1 2 1/16	14⅛	4·88	2 2½	77 9¼	31 3/16
May 12	25·30	20·58	1 1 3/16	13⅞	4·88	2 2¼	77 9¼	30 15/16
„ 26	25·28¾	20·59	1 1¾	13 27/32	4·87⅝	2 2⅜	77 9	31 3/16
June 9	25·30	20·56	1 2	14	4·87½	2 2⅞	77 9	31 5/16
„ 23 ...	25·30	20·55	1 2 1/16	14 3/16	4·87¼	2 2⅝	77 9¼	31 7/16
July 7	25·30	20·53	1 2 3/32	14⅛	4·87	2 2½	77 9	31½
„ 28 ..	25·28¾	20·52	1 2 1/16	14 3/16	4·87½	2 2⅝	77 9¼	31 7/16
Aug. 11 ...	25·30	20·54	1 2 3/16	14 3/16	4·86¾	2 2⅛	77 10	31 3/16
„ 25	25·28¾	20·55	1 2	14 1/16	4·83¼	2 1¾	77 10½	30⅝
Sept. 8	25·28¾	20·55	1 2⅛	14 5/32	4·82¼	2 1⅝	77 11	30⅝
„ 22	25·32½	20·59	1 2⅛	14 3/16	4·81¼	2 1½	77 11½	30 3/16
Oct. 6	25·30	20·57	1 2⅛	14 5/32	4·82¼	2 1½	77 11	30⅛
„ 20	25·36¼	20·62	1 2⅜	14 17/32	4·81¼	2 1⅜	77 10¾	30⅛
Nov. 3	25·36¼	20·63	1 2¾	14 13/16	4·81½	2 1⅝	77 10½	30 3/16
„ 17	25·37½	20·66	1 3½	15 1/16	4·82½	2 1¾	77 10¾	30
Dec. 1 ...	25·37½	20·63	1 3⅛	15 3/16	4·83½	2 1⅝	77 10½	29⅞
„ 15	25·37½	20·63	1 3¼	15 5/16	4·84¼	2 1¾	77 11¼	30
„ 29	25·35	20·62	1 3 5/16	15 13/32	4·83½	2 1⅝	77 10½	29⅞

* Wednesdays following. † Thursdays following. ‡ Fridays following.

Vol. LX.] [Part II.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY,

JUNE, 1897.

AGRICULTURE *in* ESSEX *during the past* FIFTY YEARS, *as* EXEMPLIFIED *by the* RECORDS *of* ONE FARM, *with special reference to the* PRICES *of* CORN *and the* CONDITIONS *of* LABOUR.

By FREDERICK CHARLES DANVERS.

[Read before the Royal Statistical Society, 16th March, 1897.
The Right Hon. G. SHAW-LEFEVRE, Hon. Vice-President, in the Chair.]

So much has, of recent years, been written and spoken with regard to the depressed state of agriculture, that an apology seems almost due to the Members of the Royal Statistical Society for bringing the subject again under their notice. Several papers on questions relating to agriculture are to be found in the *Journals* of this Society, of the Royal Agricultural Society, in the "Land "Agents' Record," and elsewhere, so that there would appear to be few new facts now possible of being advanced. Most of the papers I have examined, however, deal as a rule with the general question of agriculture or of wheat supply, and it has occurred to me that further valuable information might be added to the facts already published by an examination into the records of a single wheat growing farm during the recent periods of agricultural prosperity and depression, and by comparing the results thus obtained with the valuable statistics for the whole kingdom printed annually by the Board of Agriculture.

The materials for such a purpose as this are, however, I expect, rarely to be found except in the case of model farms; but these are not necessarily managed upon the same principles as regards financial results as is the case with farms conducted by independent agriculturists. It is to the latter class the country has to look for its home grown food supplies; and whilst the former class of holdings may—and no doubt do—act as a means of affording much valuable information with regard to certain details of, and improvements in, various branches of agriculture, it is to those who have made farming the business of their lives we must look for carrying those improvements into practical effect.

Anyone desiring to prepare statistics of the working of a single

farm for a long series of years, might certainly spend a considerable time in inquiries, and traverse a large extent of country before finding the necessary materials available for that purpose. If the officers acting for the Board of Agriculture have at times experienced difficulties in obtaining the materials required for the annual agricultural returns—as stated in one of the early reports—owing to the omission by farmers to include certain apparently necessary details in their books, how much greater would be the difficulty in finding all those details, and more besides, accurately recorded for a single farm during a period of upwards of half a century. Circumstances have brought me into communication with the owner of a fairly typical wheat farm, which has been conducted upon strictly commercial principles by himself, and by his father before him, continuously since the year 1843, whose accounts have been kept in the most clear and accurate detail. It occurred to me that a critical analysis of these accounts would afford valuable material for a paper to be read before this Society, and I have to accord my thanks to the present owner of the farm in question, not only for kindly placing his books at my disposal for this purpose, but also for the assistance he has given me by compiling tables from the same, and for otherwise helping me in the preparation of the present paper.

With the view of examining the accounts of this farm in the light of the general condition of agriculture throughout the country, as shown in the returns and statistics annually published by Government, I purpose in the following remarks to read together the two sets of statistics, viz., those of the farm in question, and those of the whole country, so that the one may throw light upon the other, and show how the continued changing circumstances of the wheat market have been met by corresponding alterations in the management of a wheat farm. Unfortunately, the Agricultural Returns, published by Government, only date from 1866, so that a complete comparison with the accounts of the farm in question is not possible previously to that date, but we can compare prices from the commencement of the farm accounts, as the price of wheat in this country has been included, from a sufficiently early date, in the annual statistics for the United Kingdom.

For statistical purposes, the Board of Agriculture divides England into two divisions, in which the counties are so nearly equal in area, that of the total acreage returned for all England, $52\frac{1}{2}$ per cent. is in the grazing—or western—division, and $47\frac{1}{2}$ in the corn growing—or eastern—division. In the latter division, 43 per cent. of the total acreage was, in 1869, under corn crops. The acreage under wheat in the corn counties was, at that

date, 61 per cent. of the whole wheat area, thus leaving only 39 per cent. to the grazing counties. The following table shows the acreage under wheat in Great Britain since 1866, and the proportion in the grazing and corn divisions respectively :—

TABLE I.

Year.	Great Britain.		Grazing, or Western Division of England.		Corn, or Eastern Division of England.	
	Corn Crop Area.	Wheat Crop Area.	Wheat Area.	Per Cent.	Wheat Area.	Per Cent.
	Acres.	Acres.	Acres.		Acres.	
1866....	9,252,784	3,350,394	—	—	—	—
'67....	9,284,780	3,367,876	—	—	—	—
'68....	9,433,532	3,652,125	1,286,000	—	2,111,000	—
'69....	9,758,037	3,688,357	1,308,000	39·0	2,109,000	61·0
1870....	9,548,041	3,500,543	1,211,747	40·0	2,036,226	60·0
'71....	9,675,261	3,571,894	1,230,958	37·0	2,081,592	63·0
'72....	9,573,551	3,598,957	1,233,217	37·0	2,103,671	63·0
'73....	9,458,928	3,490,380	1,193,054	36·7	2,059,748	63·3
'74....	9,431,480	3,630,300	1,254,348	37·0	2,137,092	63·0
'75....	9,451,650	3,342,481	1,135,192	36·3	1,993,355	63·7
'76....	9,184,769	2,994,957	984,958	34·9	1,837,384	65·1
'77....	9,210,129	3,168,540	1,047,077	35·1	1,940,052	64·9
'78....	9,167,646	3,218,417	1,079,656	35·5	1,961,585	64·5
'79....	8,985,234	2,890,244	959,407	35·3	1,759,585	64·7
1880....	8,875,502	2,909,438	956,869	34·8	1,788,864	65·2
'81....	8,847,976	2,805,809	927,392	35·1	1,713,653	64·9
'82....	8,833,380	3,003,960	997,436	35·3	1,832,055	64·7
'83....	8,618,675	2,613,162	835,482	33·9	1,631,114	66·1
'84....	8,480,730	2,677,038	850,679	33·6	1,680,032	66·4
'85....	8,392,006	2,478,318	787,722	33·5	1,561,583	66·5
'86....	8,260,165	2,285,905	699,233	32·4	1,461,893	67·6
'87....	8,145,894	2,317,324	713,851	32·5	1,483,729	67·5
'88....	8,187,758	2,564,237	804,610	33·3	1,614,055	66·7
'89....	8,075,172	2,449,354	752,640	32·4	1,568,864	67·6
1890....	8,033,133	2,386,336	717,229	31·8	1,538,465	68·2
'91....	7,924,833	2,307,277	680,026	31·0	1,512,367	69·0
'92....	7,808,031	2,219,839	627,009	29·8	1,475,960	70·2
'93....	7,655,739	1,897,524	534,973	29·7	1,263,896	70·3
'94....	7,854,974	1,927,962	553,475	30·3	1,273,151	69·7
'95....	7,400,227	1,417,483	369,965	—	969,841	—
'96....	7,416,690	1,693,957	452,699	—	1,156,556	—

This statement shows a steady and gradual annual falling off, with but few fluctuations in the opposite direction, in the area under wheat cultivation in Great Britain, concurrently with the fall in price of that article. These figures have a greater significance if we take into consideration the fact, stated in the "Report on "Agricultural Returns for 1868," that "in round numbers "240,000 persons are annually added to the resident population "in Great Britain. The additional wheat supply required for

" that number, at an average of 6 bushels per head, amounts to " nearly 180,000 quarters, which, at an average English yield of " 28 bushels per acre, represents the produce of upwards of " 30,000 acres, and a much larger acreage at a lower rate of " production."

In 1895 the area of wheat cultivation in Great Britain was less than half that of 1866, and, on the above quoted basis of production and consumption, it was then only sufficient for the food of a little over $6\frac{1}{4}$ millions of people, or less than one-sixth of the population. In other words, the home production of wheat is probably less than sufficient for two months' consumption.

Making allowance for a somewhat higher rate of increase of population than in 1868 in more recent years, in order to meet the requirements of the country in respect to wheat supply, there should have been an addition of about a million acres under wheat cultivation since that date, whereas there has been an actual falling off to the extent of about $2\frac{1}{4}$ million acres, and this falling off, although it has been actually greater in the corn growing than in the grazing division of the country, has been proportionately greater in the latter, the percentages of decrease being 39·7 and 57 respectively.

The foregoing statement and remarks do not however afford even an approximate idea of the actual deficiency in our wheat area of cultivation. As will be seen from Diagram I, the net import of wheat and wheat flour into England in 1868 amounted to $35\frac{1}{4}$ millions of cwts., and in 1894 the figure stood at close upon 96 millions of cwts., for the production of which, at the rate of 28 bushels per acre, and 504 lbs. the quarter, an additional wheat area of between six and seven millions of acres would be required. In this diagram I have also included a curve showing the annual average prices of wheat between 1845 and 1895, and a third curve showing the areas under wheat cultivation each year during the same period in Great Britain.

The county of Essex, in which the particular farm I am about to refer to is situated, is in the corn division of England. In 1869, according to the agricultural returns for that year, it contained a total area of 1,060,549 acres, of which 428,000 acres, or about 40 per cent., was under corn crops, and of this about 193,000 acres—being 40 per cent. of the corn area, and 18 per cent of the total area—was under wheat. Tables II and III give the areas under corn crops and under wheat respectively of the county of Essex, and of this particular farm, the former table showing the areas on the farm alone before the publication of the Agricultural Returns, and the latter those of the county and farm since the commencement of those returns.

DIAGRAM I.

SHOWING NET IMPORTS OF WHEAT AND WHEAT FLOUR INTO GREAT BRITAIN;
ANNUAL AVERAGE PRICE OF WHEAT, AND AREAS UNDER WHEAT IN GREAT BRITAIN.

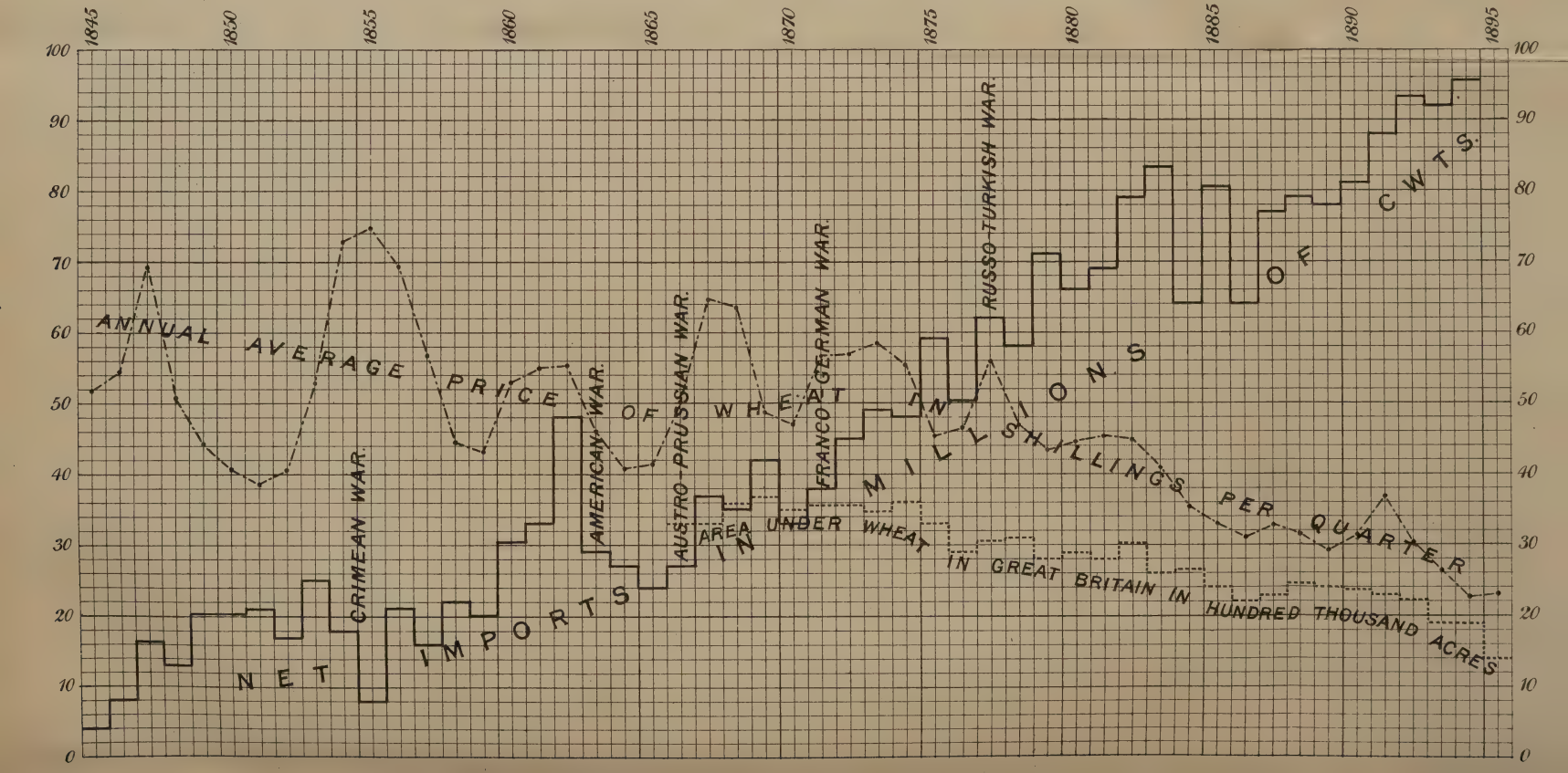


TABLE II.—*Corn and Wheat Areas on the Essex Farm (Total Area of Farm 368 Acres).*

Year.	Corn.	Wheat.	Year.	Corn.	Wheat.	Year.	Corn.	Wheat.
	acres.	acres.		acres.	acres.		acres.	acres.
1843 .	162	109	1852....	173½	71	1859....	167½	55½
'46*	187	69	'53....	146	59	1860....	180	75
'47....	195	99	'54....	161	58	'61....	288	74
'48....	199	94	'55....	154	67	'62....	160	72
'49....	193	87	'56....	152	100	'63....	180	70
1850....	169	95	'57....	182	110	'64....	196	75
'51....	155	81	'58....	138	61	'65....	150	78

* These details are not given in the farm accounts for 1844 and 1845.

TABLE III.—*Corn and Wheat Areas in the County of Essex and on the Essex Farm respectively.*

Year.	County of Essex.		Essex Farm.	
	Corn Area.	Wheat Area.	Corn Area.	Wheat Area.
	acres.	acres.	acres.	acres.
1866	406,206	181,062	149	70
'67	399,408	179,920	193	78
'68	406,424	193,175	158½	72
'69	427,926	192,316	206	79
1870	409,755	183,601	150	67
'71	421,100	193,912	192	73
'72	408,775	197,919	164	72
'73	409,430	190,902	150	66
'74	418,757	200,670	167	74
'75	423,684	185,526	154	64
'76	406,976	168,653	186	69
'77	403,966	174,563	—*	—*
'78	401,494	175,580	196	63
'79	396,439	162,108	151	68
1880	386,399	161,452	159	61
'81	385,366	156,526	174½	58½
'82	379,111	165,521	—*	—*
'83	373,628	156,853	123	50
'84	373,592	161,787	124	58
'85	373,255	145,570	125	62
'86	365,212	138,363	125	62
'87	359,292	140,917	—*	—*
'88	359,186	150,761	200	89
'89	355,693	149,780	—*	—*
1890	353,918	145,256	—*	—*
'91	355,451	144,664	—*	—*
'92	346,614	141,288	—*	—*
'93	330,895	118,187	—*	—*
'94	344,133	120,592	—*	—*
'95	314,348	93,156	122	45

* The necessary details are not given in the farm accounts for these years.

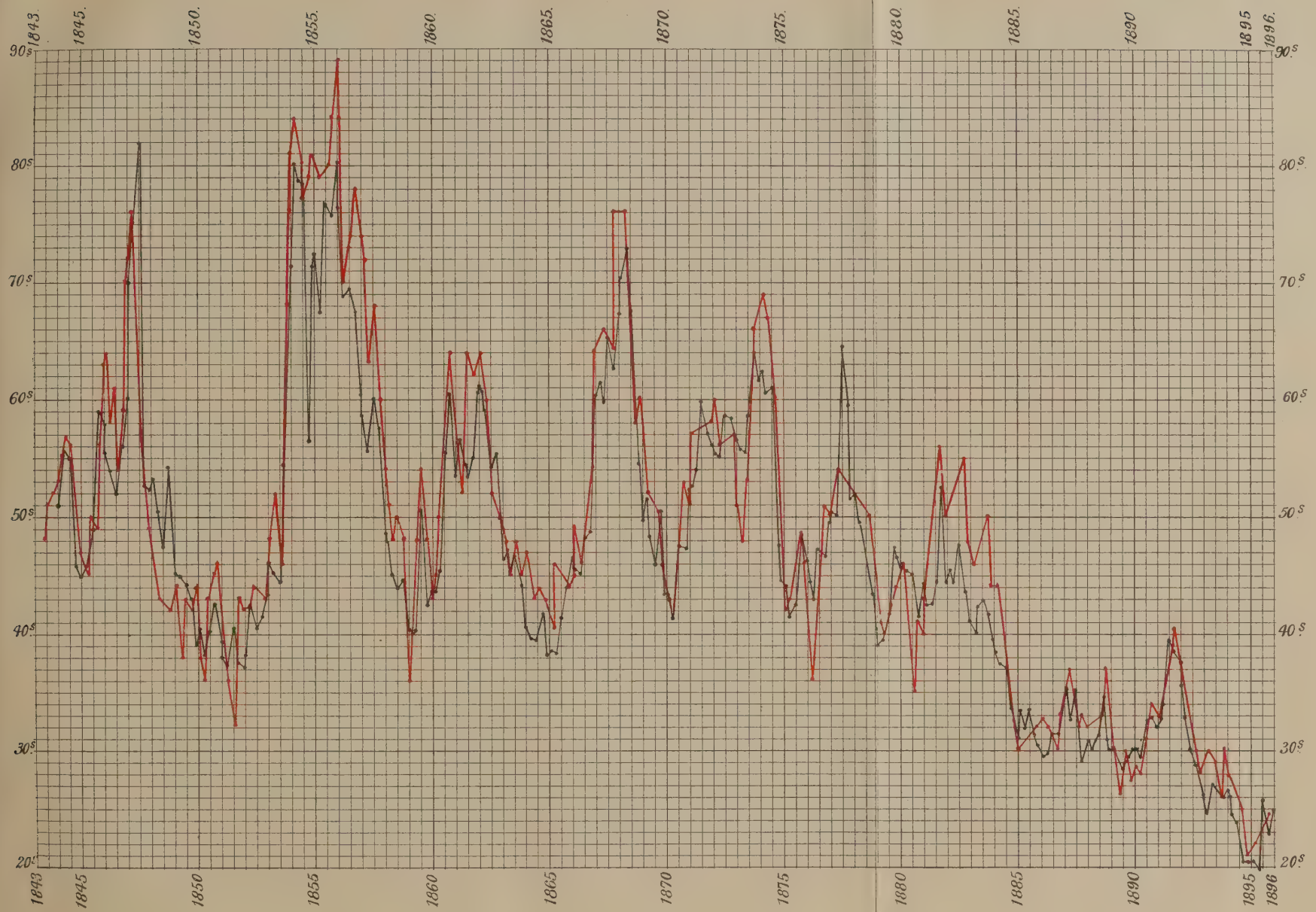
Comparing the figures given in Tables I, II, and III, it appears that while the corn area decreased in Great Britain by 20 per cent. between 1866 and 1895, it fell off in the county of Essex by 23 per cent., and on our farm by 18 per cent. between these dates, and by 25 per cent. between 1843 and 1895. Since 1866 the wheat areas in the same localities have fallen off 57, 48·5, and 35·7 per cent. respectively. This year, however, in consequence of the higher average price of wheat last autumn, and the circumstance of a favourable seed time, the area under wheat on the farm is now 75 acres, or 5 acres more than in 1866.

The Essex farm comprises 368 acres. It is situated about 13 miles from the market town of Colchester, is within 3 miles of a wharf whence water carriage can be obtained to London or any part of the east coast, and has two railway stations within about 5 miles each. In 1843, about 164 acres, or 45 per cent. of the total area was devoted to corn crops, of which 109 acres, or 66 per cent. of the corn crop, and just 30 per cent. of the whole area of the farm was under wheat. This was a record year of wheat growing on this farm until the year 1857, when the area under wheat reached 110 acres. This last named year followed the exceptionally high prices obtained for wheat in the two preceding years.

The repeal of the corn laws in 1846 does not appear to have influenced to any appreciable extent the area sown with wheat on this farm, although that area began gradually to diminish after 1849, when those laws were finally abolished. Indeed, in the year following 1846 the area under wheat was 99 acres, as compared with 69 acres in that year, and, after slight fluctuations, it stood at 95 acres in 1850, the year after the final abolition of those laws. The price of wheat was, however, gradually falling (*vide* Diagram II) and went to below 40*s.* the quarter in the last named year, whilst some was sold off this farm, in April, 1850, as low as 36*s.* This reduction in price was no doubt largely due to the increased imports of wheat from abroad, which, in 1849, rose from 13 millions of cwts. in the year before, to over 20 millions of cwts. After this the area under wheat fell gradually to 58 acres in 1854. During the intervening years there was a slight increase in the area under oats, but not sufficient to make up for the falling off of wheat, as the total corn area decreased by 32 acres, or by 16·5 per cent. Probably, however, the deficiency in wheat was principally replaced by root crops, as between 1849 and 1854 the dealings in live stock increased by more than 50 per cent.

In 1854 the outbreak of the Crimean war, coupled with a consequent shrinkage of imports, sent up the price of wheat to 80*s.*, and this was speedily followed by an increase in the area

DIAGRAM II.—SHOWING PRICES OF WHEAT FROM 1843 TO 1895 INCLUSIVE.



The Black Line gives the average prices according to the Official Corn Returns, and the Red Line the prices actually obtained on the Essex Farm.

Harrison & Sons, Lith.
St. Martin's Lane, W.C.

under wheat on the farm in question, which rose to 100 acres in 1856, and to 110 acres in the following year, the latter being the largest area recorded with regard to this farm, and amounted to just 30 per cent. of its total area, as I have already observed in an earlier part of this paper.

In 1858 the price of wheat began again steadily to fall, and in the succeeding year we find only $55\frac{1}{2}$ acres under wheat on our farm, but an increased area under barley, and still larger dealings in live stock. The area under wheat again rose to 75 acres in 1860, and—with the exception of the year 1870, when it fell to 67 acres—remained at between 70 and 80 acres until the year 1872.

Russia began to regain her wheat trade with this country immediately after the termination of the Crimean war; the United States of America made yearly increasing shipments, and British North America began seriously to compete for a share in the trade from 1860; whilst about the year 1875 the British East Indies began a serious rivalry with the farmers of Great Britain for the wheat supply to this country.

Following the fluctuations in the price of wheat, it will be seen from the annexed diagram that it began to rise again about May, 1866, and this upward movement continued for the two following years, after which a rapid fall set in. This rise in price, of course, was followed by an increased breadth of sowings in 1867 and succeeding years, and also by largely increased importations, in which Denmark, Germany, Austria, Canada, and the United States principally shared. Wheat fell again to 57*s.* 7*d.* per quarter in August, 1868, and after constant fluctuations it was at 41*s.* 3*d.* by February, 1870, but after further movements it again reached to over 60*s.* in August, 1873, and remained at, or over, that price just twelve months. It is not necessary here to follow in detail all the changes in price that have subsequently occurred, but I would ask your attention to the diagram illustrating these fluctuations for the past fifty years, which seems to show a periodical maximum and minimum at three or four years' intervals until the year 1880, when this regular alternating movement ceased.

Some of these variations are not so easily explained as others. I have already mentioned the Crimean war as a cause of the great rise in prices in 1854-55. The next great rise in 1867 followed on the American Civil war, in consequence of which the wheat importations to this country had fallen off considerably, due principally to reduced exports from the United States. Owing also to the declaration of war in 1866 by Prussia and Italy against Austria, the importation from those countries also fell off considerably.

The next great rise in the price of wheat, in 1871 to 1873, was partially due to the Franco-German war, but also to a succession of short crops throughout Europe. The rise in price in 1877-78 was due principally to the Russo-Turkish war. After that date there has been an almost unbroken downward tendency until the autumn of last year, when a partial revival took place.

These facts, viewed by themselves, lead to the melancholy reflection that foreign wars constitute the brighest hope for the British farmer. It may, however, be observed that peace cannot be disturbed in any civilised country of the world without affecting, to a greater or less degree, the wheat supplies to this country. It will be seen by reference to Diagrams I and II that on the occasion of each great war within the past half century there has been a decided check given to, and a falling off in, the amount of wheat imports to this country, which has been followed in every case by a considerable rise in the price of that grain, and also, as a rule, by an increase in the breadth of land sown in Great Britain.

The prices of wheat at different periods are given in Diagram I, where the black line shows the average prices as given in the Government Statistical Tables, and the red line the actual prices obtained for wheat sold during the same periods on the Essex farm. The close coincidence of these lines is at one and the same time a valuable proof of the extraordinary accuracy of the Board of Trade statistics, and an evidence of the satisfactory price obtained by the Essex farmer for his grain.

The causes which have led in various years to a diminution of the area under wheat are various. Unfavourable seasons at seed time contributed to reduced areas being sown in 1876, 1883, 1886, 1889, and 1895, whereas with an exceptional favourable seed time there has generally been an increase in the areas sown with wheat. The general causes of depressed prices of wheat may be said to be cheap foreign competition; besides this, however, attention has recently been directed to the injurious effects of gambling in fictitious deliveries, or, as it is sometimes referred to, as "wheat "options." This practice has recently been prohibited in Canada, under a severe penalty, by Section 201 of the Canada Criminal Law; and an enactment against similar transactions passed in Germany by the Reichstag came into operation on the 1st January of this year. This subject as affecting agriculture is fully dealt with in a phamphlet entitled "The Ruin of the World's Agri-"culture and Trade," by Dr. G. Rühland—which has recently been published in this country—and in a paper on "Wheat "Options," lately read at a meeting of the Farmers' Club in London, by Mr. William E. Bear.

We have next to consider the steps taken by farmers to meet the altered conditions of agriculture in consequence of the unprofitable nature of wheat growing in recent years. The former owner of our particular farm used to say that he could not make it pay unless his corn crops brought him in 2,000*l.* a year; and no doubt he held to the old axiom that wheat growing was not profitable unless it could be sold at 40*s.* a quarter, or upwards. Circumstances have, however, changed since that was an article of belief.

Owing principally to the fall in price of wheat, together with that of all other agricultural produce, rents have been greatly reduced, in which also this particular farm has likewise participated. The rent paid for it in 1843 was 620*l.* a year. This was reduced in 1852 to 570*l.*, at which it remained until 1866. In that year it was raised to 575*l.*; in 1867 to 590*l.*, and in 1868 to 640*l.* On the retirement of the former tenant in 1881, there was an unexpired lease of seven years. The farm was then taken over by his son at the last mentioned rent (640*l.* a year), and he paid his father besides 80*l.* a year for the remainder of the lease. In addition to these amounts the tenant had also to pay a tithe rent charge of 120*l.*, thus making a total rental of 840*l.* a year.

On the renewal of the lease in 1888 the rent was reduced to 555*l.*, whilst the tithe rent charge remained the same, thus making the total paid by the tenant 675*l.* per annum. This has since been further reduced; the tithe is now paid by the landlord, and the total rent stands at 422*l.* per annum. Thus the rent of the farm is now almost exactly half what it was to the tenant in 1881, notwithstanding which, however, the accounts show that the profits now realised are scarcely one-half what they were at that date. The introduction of machinery, and cheapening of the means of transit, have also brought about economies in ploughing, reaping, threshing, and delivery, but these advantages have been partially neutralised by a rise in the rates of wages.

In 1886 the breadth under oats was the largest on record since 1866. In one instance it is reported that oats and wheat were sold at the same price, viz., 28*s.* per quarter, and as an acre of oats yields—it was remarked—"one-third more than an acre of wheat, "and costs less to cultivate, while it can be grown on inferior land, "the straw being quite as valuable for cattle, it is hardly surprising "that oats are supplementing wheat in many corn growing "counties."

That this particular farm has been able to continue growing wheat to the extent it has done, is, no doubt, in a great measure due to the special suitability of the soil for that crop. It has already been remarked that the average English yield of wheat is

at the rate of 28 bushels per acre, but on this particular farm the yield is much higher, and during the last fifty years has produced from 30 to 50 bushels, giving an annual average for the forty-one years for which the returns are complete in this respect of $38\frac{1}{2}$ bushels an acre. One year (1873), which has been included in this average, the yield fell to as low as 27 bushels. The wheat area was then 66 acres. Taking five years' averages, the figures work out very fairly even, and are as follows:—$38\frac{1}{5}$, $34\frac{2}{5}$, $40\frac{1}{5}$, $37\frac{1}{5}$, 40, 41, $38\frac{2}{5}$ and $38\frac{1}{5}$ bushels per acre respectively. The acreage under corn has not practically fallen much on this particular farm, excepting for the last two years, viz., 1894 and 1895. The last year for which a full detailed account of the corn acreage has been kept is 1888, when the total area amounted to 200 acres, of which 89 acres were under wheat, 58 acres under barley, and 53 acres under oats. The average price of wheat in that year—according to the statistical tables—was 31*s.* 10*d.*, and yet the corn sales amounted to no less than 1,621*l.*, whilst so recently as 1893 they realised 1,431*l.*

Comparing the relative returns per acre obtained from wheat and barley, and selecting for this purpose the years when wheat was at its periodical highest, or thereabouts, I find the results to have been as follows:—

	Wheat.	Barley.
	Per acre.	Per acre.
	£ *s.*	£ *s.* *d.*
1843	12 7	9 10 10
'54	20 3	7 – –
'67	14 –	9 – –
'73	10 16	12 14 –
'81	9 16	9 13 –
'88	6 15	9 9 6

As the cost of cultivating an acre of wheat, including ploughing, manure, seed, reaping, &c., is about 5*l.*, it is clear that when that crop produces only 6*l.* 15*s.* per acre, out of which rent and taxes and interest on capital have still to be taken before calculating the net return to the farmer, it would be impossible to continue to grow wheat under these conditions, even if the land were occupied rent free.

Oats do not appear to have been much grown on this farm for sale until after 1881, but such as were raised were principally for use on the farm. Taking a few recent years for which the returns are complete, I find that the yield values were as follows:—

	Per Acre.		Per Acre.
	£ *s.* *d.*		£ *s.* *d.*
1884	11 15 –	1886	10 5 3
'85	9 5 6	'88	9 1 9

Although, as I have already shown, the area of corn cultivation upon this particular farm has not very materially changed during the period under review, the farm itself has been made to produce more than in the early years of this period, but, in consequence of the general fall in prices, this increased yield has not been of a correspondingly profitable character. To compensate for the fall in the value of corn generally, increased attention has been given to rearing stock. Since about 1882 this increase of stock has been most marked; and whereas the stock sales in the early years of our returns ranged between 1,200*l.* and 2,000*l.* a year, when better prices prevailed than in more recent times, for some years after 1882 these sales ranged between 5,000*l.* and 6,000*l.* per annum; and although they have somewhat diminished since 1889, they still stand much above what they were fifty years ago.

Conditions of Labour.

The parish in which this farm is situated is in the midst of a purely agricultural country, and, like most rural districts, its population has, for a number of years, been gradually on the decrease. Thus, in 1841 it had a population of 1,145, which rose slightly by 1851 to 1,177; in the next ten years there came a falling off, and the population stood in 1861 at 1,038. For the next ten years it remained practically stationary, being 1,047 in 1871. After this a regular and serious decline set in, following the general agricultural depression and very unequal fall in the prices of agricultural produce, which began in 1873, and the population subsequently fell to 915 in 1881, and to 845 in 1891.

Judging from appearances, the inhabitants of this parish are a healthy and vigorous race; a few of the young men find their way to Harwich and enter the Navy, some join the Army at Colchester, and others again drift up to the great metropolis and there find employment in the Police force or at other occupations. For those that remain agriculture is almost the only resource.

With reference to the rate of pay of agricultural labourers in this district—or perhaps, to be more exact, I should say on the particular farm under consideration—it seems to be the practice to fix a comparatively low rate of wages for the men, which rate appears, *prima facie*, to be wholly inadequate for their proper maintenance. A great quantity of work, however, is given them to perform which is paid for by the piece, such as mowing, thatching, hedging and ditching, and fencing, and, in former years, before the introduction of machinery, reaping was also paid for by the acre. Besides this, the ordinary rate of wages is suspended during harvest time, and a lump sum is paid to each

man for the harvest work, which generally lasts about a month, and is calculated at a much higher rate than the usual weekly pay. During this month overtime payments are suspended, but overtime is regularly paid for at other periods of the year and forms another source of extra remuneration. At the commencement of our farm statistics the harvest payment stood at 5*l.* 5*s.* to 5*l.* 10*s.* In 1855 it was raised to 5*l.* 15*s.*, and in the following year to 6*l.* The amount paid seems to have varied between these two last named sums until 1872, when it was raised to 6*l.* 10*s.*; in 1870 it was advanced to 7*l.*, and in 1880 to 8*l.* 10*s.* This high rate seems to have been exceptional, for it shortly dropped again to 7*l.*, at which figure it has continued to the present time. It thus appears that this one item of remuneration has, within the period of our review, been raised from 5*l.* 5*s.* to 7*l.*, or by 33 per cent. On the other hand it used to be the practice to make quarterly payments to the men under the name of "beer money," which was calculated at 1*s.* per week during summer, and at 6*d.* per week during the winter season. This payment has now been discontinued as a separate item, and is included in the general rise of wages.

The farm account books do not show the nominal wages paid to the several labourers, but only the amounts they actually received each week; and, as has been already explained, this often includes special earnings on piece work, so that a man's actual earnings invariably exceed considerably his nominal amount of weekly wage. The actual amount he earns depends, to a great extent, on his individual perseverance and industry.

In the early years of these returns women and children often figure in the accounts; the former being paid at the rate of 6*d.* a day, boys received a similar amount, girls 4*d.* and 5*d.*, and children 3*d.* a day. A household, therefore, when a mother and several children went into the fields, could add considerably to the family purse. At harvest time a number of extra hands have to be taken on, and these are paid for by agreement, and not necessarily at the same rate as the permanent staff. In former years it was not unusual for a man to go about the country at this season with a gang of children, whom he hired for field work to the farmer at a certain price. After about 1866 women, girls, and children appear less frequently in the accounts; and the latter disappear altogether after the passing of the Education Act of 1870, whilst women appear but rarely subsequently to that date.

The number of men and boys permanently employed on the farm does not vary much now from what it was in 1843, but the average is, if anything, fewer than formerly; nevertheless, the wages sheet shows a considerable increase, and the amount paid has risen from an average of 594*l.* per annum for the first

ten years of the period under review, to an average of 731*l.* per annum for the last ten years.

A table of wages for the past fifty years is annexed:—

Table of Wages.

	£	*s.*	*d.*		£	*s.*	*d.*		£	*s.*	*d.*
1843	605	19	5	1861	683	16	10	1879	799	18	6
'44	642	5	8	'62	728	19	7	'80	807	9	2
'45	651	14	10	'63	614	2	4	'81	825	10	–
'46	679	3	2	'64	652	1	9	'82	797	12	2
'47	678	16	2	'65	640	1	7	'83	790	13	7
'48	617	12	1	'66	712	9	9	'84	795	10	9
'49	593	2	7	'67	809	8	10	'85	723	–	1
'50	495	10	2	'68	775	6	11	'86	667	8	7
'51	476	15	2	'69	970	11	11	'87	809	4	3*
'52	512	3	8	'70	603	12	6	'88	822	5	5*
'53	557	–	2	'71	601	15	7	'89	873	4	11*
'54	629	9	1	'72	658	8	8	'90	710	15	9
'55	648	6	3	'73	715	19	7	'91	701	8	10
'56	742	3	8	'74	697	19	11	'92	801	16	1
'57	773	13	–	'75	650	3	3	'93	693	4	1
'58	663	3	9	'76	660	4	3	'94	705	13	10
'59	556	10	2	'77	800	2	5	'95	633	7	8
'60	619	2	7	'78	779	1	11				

* 110 acres more land occupied during these three years.

Between 1843 and 1849 the wages paid amounted to between 600*l.* and 675*l.* per annum. In the two following years it dropped to 495*l.* and 476*l.* respectively, and stood at 512*l.* in 1852. From this date they rose again rapidly, and amounted to no less than 773*l.* in 1857. After this wages fell again, and in 1871 they stood at 601*l.* There was a general rise in wages in the two following years, and by 1873 they amounted to 715*l.* In 1882 to 1884 they stood at over 700*l.* a year, and in 1892 at 801*l.* This last mentioned year and 1893 were the seasons most unfavourable for agriculture, and wages again came down to about 700*l.* in the last named and following year, whilst in 1895 they were further reduced to 633*l.* The average payments for the first and last ten years show an increase in the wages accounts for the latter period of no less than 137*l.* per annum.

The actual wages paid at present on this farm are as follows:—foreman 16*s.* a week, with a cottage rent free; horsemen 12*s.* a week, also with a free cottage; and ordinary labourers 11*s.* a week each. The two best labourers have also each a cottage rent free (there being four cottages on the farm), but the remainder have to find cottages for themselves out of their wages. Without further explanation it might truly be said that 11*s.* a week is but a scanty rate of pay on which to maintain a wife and family. To this must, however, be added the earnings at harvest time and for piece work.

The former is equivalent to an addition of 1*s.* 6*d.* a week to his wages the year round; or, in other words, apart from piece work he in fact earns 12*s.* 6*d.* a week as regular pay. In the spring time a labourer hoeing turnips on piece work may earn 3*s.* a day; and, altogether, an average man will earn 16*s.* a week taking the year round.

In order to test the accuracy of this statement, I have taken out the wages, week by week, of one of the labourers at present employed, and find that he earned on an average 16*s.* 5*d.* a week throughout the year. Only for two weeks did he draw so small a sum as his nominal wage of 11*s.*; for four weeks he drew 1*l.* and over each week, the highest amount being 1*l.* 3*s.* 4*d.*, and for twenty-two weeks he drew over 12*s.* 6*d.*, a week in sums varying from 12*s.* 10*d.* to 19*s.* 11*d.* a week. These earnings were, of course, exclusive of the 7*l.* for harvest work. This labourer has not one of the farm cottages, and has to rent a cottage at about 4*l.* a year, after paying which he still would have 14*s.* 10*d.* a week to live upon. Of course those who are fortunate enough to have farm cottages free would be able to enjoy about 1*s.* 6*d.* a week more for their maintenance.

Besides this, however, those who have farm cottages enjoy fairly good sized gardens also, in which they can raise vegetables enough for the consumption of their families; and, for the most part, they also keep poultry, which no doubt find the greater part of their maintenance in the adjoining farm fields. Since the passing of the Allotments Act in 1887, the condition of these farm labourers has still further improved, and some of them cultivate as much as two acres on their own account, the produce of which they sell when it exceeds the requirements of their own households.

The foreman on this farm has not the same advantage as the labourers of adding to his earnings by extra work, and receiving, as he does, only 16*s.* a week, with a cottage, he would not appear to enjoy much advantage, from a pecuniary point of view, beyond his harvest pay, which is at the same rate as the labourers. But he receives from his employer in lieu thereof a gratuity of 10*l.* at Michaelmas each year, which is equivalent to an extra 3*s.* 10*d.* a week, which brings up his total earnings to about a guinea a week, and he has also his cottage and garden rent free.

Taking all circumstances into consideration it cannot be said that the agricultural labourers on this particular farm are ill paid. Comparing their rate of earnings with those paid in 1858 and 1875—in each of which years I have taken out actual payments to individual men—they are certainly better off now than in the earlier years. In the former of these years the wages averaged

11*s.* 4*d.* per week, and in the latter year they were 15*s.* 8*d.* Added to the fact of their higher wage earnings at the present day, it must be remembered that all necessaries of life are now cheaper, and every shilling will therefore purchase more than formerly. They now have their children educated free, whereas formerly if these were educated at all it was at the expense of the father, and the men can now obtain allotments to cultivate on their own account in their spare hours. All these must be taken credit for in estimating the material improvements in the condition of the agricultural labourer, in comparing it with what it was in former years. Whether these advantages to the labouring men benefit also the farmers who employ them seems, however, very questionable. It is impossible to read through the evidence taken by the Royal Agricultural Commission without being struck by the repeated testimony of the inefficiency of labourers at the present day compared with what was formerly the case; and one witness, I believe, went so far as to say that it now took three men to do the work formerly performed by two.

I cannot, perhaps, do better in bringing this part of my subject to a conclusion, than quote the following extract from the Report submitted by the Chairman of the Royal Agricultural Commission (Mr. Shaw-Lefevre), Lord Rendel, and Sir Robert Giffen, who were unable to concur in the Second Report which was signed by the majority of the Commission. In referring to the question of labour the above named gentlemen observe as follows: "That "the first and proximate cause of the depression has been the "great but very unequal fall in prices of agricultural produce, "beginning in 1873, cannot be doubted. We do not propose at "present to enter upon the causes or other effects of this fall of "prices, but we must point out that another cause of the "difficulties of the occupiers of land has been the very substantial "rise in the money wages of labour, which also commenced about "the year 1873. In the greater part of Great Britain this rise "of wages has been maintained, and in some parts increased. "In the eastern and southern counties there has generally "been a fall to a lower range of wages, though not to the level "which existed before 1873. When consideration is had of the "very great reduction since then in the prices of all the main "articles of consumption of labourers, it is certain that, as com-"pared with the average profits of farmers, the interest of money, "and the rent of land, there has been a great rise in real wages "of labour, as measured in what can be obtained for them; and "that this rise in the value of wages, and the real cost of labour, "has constituted one of the main difficulties of the cultivators of "the land; for in this direction only has little adjustment been

"made in harmony with the general fall of prices, otherwise than "by economy in the employment of labour." These observations seem to be fully borne out by the statistics of the Essex farm which I have this evening brought to your notice.

General Conclusions.

It would be a presumption on my part were I to attempt to formulate on my own account any remedy for the present depressed state of agriculture. Amongst the various *nostrums* that have been proposed some greatly favour the construction of extensive systems of light railways; and, in certain localities, there can be no doubt that these would greatly facilitate and cheapen the conveyance of produce to market. But considering, as I am this evening doing, the special circumstances of a particular farm, which, as I have already explained, is conveniently situated in comparative proximity to a market town, and within easy reach of conveyance both by rail and water, it does not seem that any improved or cheaper means of conveyance are specially required in this case beyond what might be met by a still further lowering of freight charges, although, if a railway station were brought nearer it would undoubtedly enable some saving to be made both in labour and in the number of horses required. Numbers of farms in Essex are at present thrown out of cultivation, and others are let at reduced rents in order to attract tenants; an extension of this last named means of relief in the case of the special farm under consideration is too evident a means of solving the present difficulty consequent on reduced prices to need anything more than a mere mention on the present occasion. Next, after a further reduction of rent may be suggested a lowering of the present rate of taxation—imperial and local—on agricultural lands. This has been considered at length by the Royal Commission on Agriculture, and I propose to conclude this paper by a consideration of their several recommendations on this subject.

In approaching the question of the burdens on land, the Commission remark that excessive burdens may undoubtedly throw land out of cultivation, and it appears from the evidence that they have already had this effect in certain parts of the country. In other cases, where the results have not yet been equally disastrous, the imposition of excessive burdens on land must tend to discourage the investment of capital, the application of enterprise, and the employment of labour on land, and thereby operate directly to the detriment of the whole agricultural community, and ultimately to the injury of the community at large.

There seems to be a consensus of opinion amongst the members of the Royal Commission on Agriculture, that the land tax in its

present incidence bears unduly upon property in general; and even in parishes it is instanced that the tax does not necessarily fall equally on the different properties, for although it is required to be collected by an equal rate in the pound, according to the annual value of the property, there is no definition of "annual "value" in the Land Tax Acts, and there is a great diversity of practice with regard to the assessments. "Unfortunately," the Commissioners remark, "this tax is exceptionally heavy in the "counties which have suffered most from the agricultural depres-"sion. Nearly one-fifth of so much of it as was originally charged "on lands and tenements fell, and nearly one-fourth of the quotas "remaining unredeemed now falls, on the counties of Norfolk, "Suffolk, Essex, Lincoln, and Wiltshire. These counties appear "to have been hardly used in the original allocation of the quotas, "and the very serious depreciation in the value of agricultural "land which has taken place in them has greatly intensified the "original hardship." Some examples are given of parishes in these counties in which the rate in the pound of the land tax has been increased within the past fifteen years, "presumably," it is stated, "owing to agricultural depression." It will be sufficient here to give instances of this for the county of Essex, with which we are, at present, more particularly concerned; of this county it is stated that in one parish the land tax rose from 1*s.* 4½*d.* to 4*s.*; in another from 1*s.* 2*d.* to 2*s.* 6*d.*, and in a third from 1*s.* 1*d.* to 2*s.* 5*d.* After giving particulars of other counties, the Commissioners observe that this tax has long ceased to be a tax on means and substance; that it is full of inequalities and anomalies; and that it is a tax operating with peculiar unfairness on the agricultural interest in the parts of the country in which the depression is most severe. In summing up their remarks relating to imperial taxation they conclude by saying, "it "is clear that there are inequalities in the imperial taxation falling "on different classes of property, and operating to the disadvant-"age of rateable properties generally as compared with non-"rateable, and as between rateable properties themselves, to the "disadvantage of agricultural lands, now suffering from un-"exampled depression. We consider," they add, "that the "attention of the Legislature to the whole subject is urgently "demanded."

On the Essex farm to which I have referred in this paper, the land tax is little more than nominal, and it now stands at only 4*d.* annually.

With regard to local taxation on agricultural land there seems to be some divergence of opinion amongst the Commissioners. The burdens imposed by direct local taxation, it is shown, "fall

"exclusively on less than one-half of the property of the country, "and on that portion of property which has hitherto contributed "the larger share to imperial taxation. On no subject," they continue, "has a greater concurrence of opinion prevailed on the "part of the tenant farmers who have been examined by us, and "who have appeared before our assistant Commissioners, than on "the injustice of the present system of local taxation, and the "necessity for its re-adjustment so far as it affects agricultural "lands. It has been represented to us again and again by "these witnesses, that the owners and occupiers of agricultural "land are specially rated for purposes for which they "ought not to be rated; that the capacity of the land to "bear the charges now borne by it has been greatly reduced; "that agricultural land has to bear an undue share of the local "rates in proportion to the present value of its produce; that "many of the charges on real property are essentially imperial "charges, and ought in fairness to be borne by all classes of property; "and that the whole question of local taxation ought to be reopened, "and considered in a comprehensive manner, so that all classes may "be made to contribute in proportion to their ability to the ex- "penditure on the relief of the poor, education, lunatics, police, "administration of justice, and other national charges, now mainly "chargeable on the local rates." The majority of the Commission express an opinion that in order to place agricultural lands in their right position as compared with other rateable properties, it is essential that they should be assessed to all local rates in a reduced proportion of their rateable value; in a separate report, however, signed by three members only, it is cautiously remarked that the existing widespread feeling against local rates ought not to induce us to forego careful inquiry into the actual amount of their burden and as to what has been their course of late years; "nor would "it be wise," they add, "on account of a depression, which it is to "be hoped will be temporary, to make permanent changes in the "system of rating except upon very sure grounds."

The assessment of our Essex farm was, in 1881, 508*l.*, and the rates amounted to 65*l.* 2*s.* 3*d.*, or about 2*s.* 6*d.* in the £; at the present time it is assessed to the sum of 298*l.* 2*s.* 6*d.*, and the rates paid last year amounted to 57*l.* 13*s.*, or nearly 4*s.* in the £.

In consequence of the recent report of the Royal Commission, an Act was passed on the 20th July last, which is to come into force after the 31st March, by which occupiers of agricultural land are to be exempted from payment of one-half of certain rates thereon, and the deficiency is to be made good out of the proceeds of the estate duty derived in England from personal property.

The report of the Royal Commission on Agriculture, to which I

have now referred, is, however, not their final report, and we must wait patiently for the further results of their consideration of the evidence already collected, which it is hoped may eventuate in practical suggestions for alleviating the present state of depression under which agriculture in Great Britain now suffers.

Discussion *on* Mr. Danvers's Paper.

Mr. H. Moncreiff Paul said that as the question of wheat statistics had frequently been discussed before this Society, he did not propose to deal with it. With regard, however, to wheat options, wherever a standard of value could be obtained without actual inspection of the produce to be sold, by the help of telegraphic communication, there was pretty sure to be "c.i.f." business or a system of sales before delivery and even before the article had been produced. It was impossible therefore to stop the option system, or *marché à terme*, by legislation, either in this country, France, or Germany. He thought that in order to ascertain the profit or loss on any farm, especially in Essex, the other products besides corn ought to be included. Essex was a county sufficiently near to the metropolis to warrant the development of dairy farming, where there existed a suitable outlet for the sale of milk and butter. In proof of this he might add that some years ago, when no tenants could be found for certain Essex farms, some Ayrshire farmers migrated to that county, and had done a good business there, having disposed of their dairy produce to advantage in London. More attention ought to be given to such produce in this country. Denmark sent over butter in large quantities to the northern provincial markets, and the Danes were able to acquire large profits simply by the application of scientific principles. What the Ayrshire men had done in Essex could be done to a much larger extent if the same scientific principles were applied to this country as a whole. To give a practical illustration, the average yield of milk per cow for the United Kingdom was computed to be 450 gallons, but in ten Scotch counties it was as high as 600 gallons, and on some experimental farms, such as that of Sir John Lawes, the return was as much as 850 gallons. Increases of this kind, obtained by careful farming, would make a vast difference, and in the development of the stock and dairy produce industry on scientific principles throughout Great Britain lay the secret of success to her agricultural classes.

Mr. R. H. Rew thought that comparatively few people had as yet mastered the difficult question of wheat options, but it seemed to him that it had reached a stage when an authoritative inquiry was desirable, whereby some amount of misconception might at

any rate be removed. Reference had been made to legislation on this subject in Canada and Germany, and though it was impossible to estimate at present what was the result of the law which had just come into operation in Germany, he should be glad if Mr. Bear could tell them what had been the effect of the law on the price of wheat in Canada. He would like to know on what authority Mr. Moncrieff Paul stated that a much higher quantity of milk per cow was obtained on the average by Scotch farmers than by English ?

Mr. W. E. Bear did not imagine that the law on "options" in Canada could have had any influence on price, because the option system had never existed there. The law was passed to prevent it, and even if it had existed its suppression could not have affected prices to any great extent, because the Canadian markets had not so much influence on the prices of the world as those of the United States. Up to 1896 he considered there had been three causes for the fall in the price of wheat:—

1. The appreciation of gold.
2. A series of extraordinarily abundant harvests.
3. The option or future system.

The appreciation of gold did not account for wheat having fallen more than anything else. Then, although for a few years there had been extra crops, there were many years in the past when there had been more of a glut than during the last ten years, and yet the price had been 50 per cent. higher than it was lately. The option system had been gradually increasing since 1882, and the option markets of New York and Chicago now governed the price of wheat throughout the world. It was admitted that about ninety times the quantity of all the real wheat in those markets was sold as *paper* wheat, as the Americans called it, or *wind* wheat, which really had no existence at all. These option prices were all quoted and ruled the market; in fact the prices of spot wheat followed the option price. Last year up to the autumn prices fell, notwithstanding the fact that the wheat crop of 1895 was at least 5 million quarters less than a year's consumption, as was proved by the fact that the world's stocks, which were pretty accurately gauged and reported, were about $5\frac{1}{4}$ million quarters less at the end of the cereal year 1895-96 than at the beginning. In spite of that fact, and although stocks of wheat, as shown by the visible supplies in Europe and America, were decreasing rapidly, prices kept falling from the middle of February to the beginning of September. He attributed that entirely to the system of market wrecking. Then in the autumn came the estimates of the Hungarian Minister of Agriculture and other authorities, to the effect that the world's wheat crop of 1896 was about 20 million quarters less than that of 1895, which itself had been 5 million quarters short. That scared the speculators, and sent the prices up for a few weeks. But this rise did not last long; the highest price was reached at the end of November, and from that time down to last week it had been steadily falling, with a few fluctua-

tions, and last week wheat was 5*s.* 5*d.* a quarter less than in November. Since the last week in November every item of intelligence relating to the wheat crop until the beginning of March, when the final estimate of the Russian Minister came out, had been such as to show that the yield of the world was smaller than had been anticipated in the autumn; but in spite of all that, prices fell. All the facts as to a short crop in Australia, India, Argentina, and Uruguay became known subsequently; but apparently they had not the slightest effect upon the market. If the market had been ruled by supply and demand in the old way, the average price now would probably be at least 40*s.* instead of 27*s.* 11*d.* The bears manipulated the whole thing, there were hardly any bulls inside the markets. The bears in the United States began their operations as soon as the wheat was harvested, in fact, before it was got in. The elevator men bought the farmers' wheat in August on the basis of the May options. Thus the farmers' crop was sold at the price fixed by a gambling transaction six or eight months ahead. They kept on selling distant options at a lower price than near options, and still more below the price of spot wheat. Very often there was a difference of 15 c. a bushel between the price of spot wheat and options for May or July. Price differences were settled every day, and for every fall the bears took the difference. When they sold distant options at a low price, it lowered market prices, and so they kept on lowering prices until they forced the bulls to liquidate, and thus extinguished the contracts. Not one in twenty of these transactions ever came to its proper termination, and the great majority of options sold for May were liquidated long before that date arrived. By forcing liquidation, the bears got all the profits, and the bulls were losers. Even if prices happened to rise when the month came, the bears would not lose, because they had already settled the transactions. There were occasions, like last autumn, when the bears had to pay pretty sharply; but in the long run, and so long as there was enough wheat to go round, the game was a safe one. Occasionally a reaction was wanted, as it enabled them to sell at as high a price as possible in order to work all the better for a fall. Of course there was sometimes a "corner" in wheat; but it was rarely managed successfully.

With regard to the question of dairy farming, English farmers were not satisfied with 3½*d.* a gallon for their milk, which was what the Danes got. Dairy farming had improved wonderfully during the last ten or twelve years, partly by the energetic efforts of the British Dairy Farmers' Association, and partly by the excellent schools established by the Bath and West of England Society, and County Councils. Creameries had also been established in Ireland, and had proved successful; but the average price given for milk there was only 3½*d.*, or rather 3·56*d.* a gallon, which would hardly satisfy English farmers, except in out-of-the-way districts where they had to sell their butter very cheaply.

Mr. Clare Sewell Read said that his remarks would be mainly in support of the paper with regard to prices. He had just been

looking at his accounts for the year 1875, showing the results of the harvest of 1874, and he saw that, speaking in round numbers, his wheat fetched 50*s*., barley 40*s*., and oats 30*s*. per quarter. Last year he found the prices realised were, wheat 24*s*., barley 25*s*., and oats 14*s*. Going back to 1875 again he found the value of beef was 9*d*. per lb., pork 7*d*., and wool 40*s*. a tod. Last year beef was 6*d*. per lb., pork 4*d*., and wool 21*s*. a tod. That showed that as far as wheat cultivation was concerned, not only in the county of Essex but throughout all England, arable farming must be a mistake and would end in absolute bankruptcy. Although in this case, as they had heard, there had been a considerable amount of money turned over in the shape of live stock, showing a large increase in the sheep and cattle kept, the profits of a grazier, who was generally speaking an arable farmer too, could not have been very great, in consequence of the very high value of store stock as compared with the price of meat. He did not think there had been a decrease in the value of store stock of more than 1*l*. or 30*s*. since twenty years ago, when he received 9*d*. per lb. for beef, whereas now the price was only 6*d*., so that a grazier could not expect to have any profit at all, although the oilcake and other artificial foods were much cheaper now than they were then. With regard to the agricultural labourer, he was glad to recall the fact that when he could get employment (that was the great question with him now) he was very much better off than he was twenty years ago. Going back fifty years, he could remember the time when the usual rate of wage of the day labourer was a bushel of wheat and 3*s*. a week. The bushel of wheat might be taken at 7*s*., and the 3*s*. represented certain fixed payments which he must make, such as rent, clothes, and the like. If he were paid at the same rate now, he would get say 6*s*. 6*d*. in all. The things he had to buy, such as groceries, &c., were almost all of them very materially cheaper now than they were then. There was not perhaps much difference in the price of meat, but then he rarely got it on week days, except perhaps a piece of bacon. He was delighted to find that the labourer had not fallen on the adverse times which had certainly overtaken the occupier and owner of land, but he (Mr. Read) should be still more glad if he would rather improve the quality and quantity of the labour he gave. He did not hesitate to say, from his own experience, that in these days an agricultural labourer's idea of what was due to his employer was this: to get the largest possible amount of wage for the least possible and worst work, and as long as that went on the employers could not expect to decrease their outlay for labour. With regard to harvest wages, he paid as much per acre as his father did fifty years ago, who had no reaping machines, and nothing even in the shape of a rake worked by a horse. Now they had all kinds of expensive machinery, but though the hard work fell chiefly on the horses, the wages paid for harvesting corn per acre were just about the same now as then. The labourer was better paid, but he certainly did not do the same amount of work.

Mr. J. C. Pillman (London Corn Exchange) thought that they were that evening looking at the question entirely from the standpoint of the farmer, whose prosperity depended on the prices he got for his produce. The depression in agriculture was not caused by any reduction in consumption, but by the severe depreciation in the value of the produce. The question was how was it caused, by natural conditions or artificial ones? The corn laws were repealed because they caused an artificial rise in the price of wheat, and they were abolished in the interest of the consumer. The question now raised was, was there not an equally artificial system existing to-day which caused a depreciation in value to the detriment of the producer? It had been stated that this was due to over production, and it had also been said that the very extensive growth of wheat in silver-using countries was the cause of the present unprecedently low values. But it must be remembered that agricultural depression existed not only in England, but throughout the whole agricultural world. In the Western States of America, through depreciation in value, the farmer was being heavily mortgaged, and was in a more unsatisfactory condition than his brethren in England, because he depended almost entirely on the production of grain, whereas British farmers could turn their land in many cases to other account. The theory that over production was the cause of depreciation in values, might be shown at the present time to be fallacious. The price of wheat to-day was not a paying price to the producer, yet the silver-using countries had grown practically no wheat, and the wheat crop all over the world was last year below the average. Yet in spite of these exceptional circumstances, making it a year of actual shortage, the price of wheat had not risen to the cost of production. Did not that show pretty clearly that it was not a question of over-production; that it was not due to natural causes, but that there had grown up in the commercial world an artificial system which was depreciating the value of the produce, just as years ago we had an artificial system in this country which had the effect of raising the price against the consumer? Whoever put his capital into the soil or into manufacturing industries, was entitled to have free and fair conditions for trading; but the system which had grown up, which enabled people to sell what did not exist, and which could only be sold through this artificial system, did not help at all in the natural distribution of the produce of the world. It was really in the interest of freedom of trade that any illegitimate system of trading should be abolished. The Marquis of Salisbury in a letter to Mr. Jasper More some years ago, said that it was very difficult to distinguish between legitimate and illegitimate transactions upon this class of market; but he would say in reply to that, and to a similar remark from Sir Courtenay Boyle, that you cannot have a legitimate transaction on an illegitimate market. He was quite convinced that the only way in which the farmer could secure a fair price for his wheat, was to abolish the artificial system which was always depreciating his property. A previous speaker seemed to think an option was the natural outcome of what he termed "cost, freight, and insurance business." There were gentle-

men present, well qualified to speak, who would tell him that the option market had nothing to do with "c.i.f." business. The difference between the two was this. With the "c.i.f.," or the legitimate speculation such as existed in the "seventies," when the price of wheat was over 40*s*., the business was confined entirely to dealing in the actual article, and was limited by the quantity of wheat in the world, and naturally then speculation took the form of importing the actual stuff on "c.i.f." terms. This new system was one under which people sold enormous quantities of paper wheat which had no existence, and created monopolies by which agriculture all the world over was in the most depressed condition. Until this artificial system called "options" was abolished, he was convinced there could be no hope for agriculture, as prices of wheat would continue at unnaturally low levels, to the detriment of millions of producers, and in spite of the sound statistical position of trade warranting, as a normal condition, a level of values at or near cost of production.

Mr. W. C. Little, as a practical farmer, desired to thank Mr. Danvers for this paper. He need not point out to members of the Society how extremely dangerous it was to found conclusions on such a very small basis as the experience of one farm, knowing as he did that on two farms similarly situated and equally well farmed, the results in particular years would vary enormously. Nevertheless, taken as these figures were for a long series of years, such a contribution was most valuable, and he was not at all disposed to dispute the general conclusions which might be derived from the paper. If, as in this case, the gross rent had only been reduced by 50 per cent. and the profit by the same amount, this farm was a favourable instance, compared to many in the eastern counties. There were one or two facts which were illustrated by the paper to which he should like to call attention, and first he would refer to the statistics given with regard to wages. The distinction was clearly drawn between wages and earnings, and having had to conduct an inquiry under the Labour Commission into this particular subject, he had appreciated for a long time the great distinction between the nominal rate of weekly wages, which many people considered the measure of what the labourer received, and the earnings which he could possibly get. He had stated in his report to the Labour Commission that in countries of low wages the earnings were in some cases more than 40 per cent. above the nominal wages, and in this case it appeared that an ordinary labourer with a nominal wage of 11*s*. was able to earn, if a good workman, 16*s*. 4*d*. a week. Of course it was not to be supposed that all earned that, but it was within the capacity of an able-bodied labourer whose wages were 11*s*., to earn 50 per cent. more. In passing, he would remark that the Minority Report of the Royal Commission referred to in the paper stated rather too broadly, as was shown by this paper, that the rise in wages commenced in 1873. It would be found that on this particular farm the highest amount paid was in 1857, and his own experience certainly would lead him to believe that there was for a period

during the Crimean War a rate of wages prevailing fully equal to that of 1872, and in 1846 or 1847 he believed the rate was equally high. It was quite true that a more general and more prolonged rise took place in 1873, or perhaps a little before that. Turning to another point, they were told that the sales of live stock on this farm had increased from 2,000*l.* to 6,000*l.*, or from 1,500*l.* to 5,000*l.*, but he should like to know what the purchases were as against that. It was a very common mistake in dealing with farm accounts to treat the whole sales of live stock as produce of the farm. On one farm, say a wold farm or a down farm, where there were no purchases of live stock, and where it was all bred on the farm, the whole expenditure might be 100*l.* for rams, bulls, or stallions, that method was right, but where a man went into rearing stock and feeding stock not bred on the farm there was a large outlay for purchases. The only other subject he would refer to was that of rates. It was thought by some that rates had been reduced to the same extent as the fall in the value of the land or the tenant's profit, but this case, though of course it was only an isolated instance, bore out what he had for a long time contended, that measuring the rates by the gross profits, even though there had been a considerable diminution, they were still greater in proportion to the sum divisible between the landlord and tenant. or to what would be obtained by a man farming his own land. It appeared that, roughly speaking, the profits of the landlord and tenant had each been decreased by 50 per cent., whilst the rent actually obtained by the landlord was subject to a still further reduction, but in the face of that reduction of 50 per cent. the reduction in rates had been only 12 per cent. Thus a much larger proportion of the net produce was absorbed, although a smaller amount was actually taken.

The Chairman (The Right Hon. G. Shaw-Lefevre), in proposing a vote of thanks to Mr. Danvers, said his method of taking a single farm and comparing its conditions with fifty years ago was an extremely good one, but he left off the comparison at the point of greatest interest, for he did not give the amount of profit made by the farmer. Mr. Danvers had told him that the farmer had refused to show him his accounts, but said that there had been profits every year, and that comparing the present time with some years ago, the profits had been reduced one half. They would have liked to know what the profits were fifteen or twenty years ago as compared with the present time, for they would have thrown much light on the position. He inferred the profits in the past had been good, because it was stated that the son took over an unexpired term of seven years from his father, and paid him 80*l.* a year in addition to the rent, and that was in 1881, when the agricultural depression had already begun, and prices had begun seriously to fall; and even now, though the profits had been reduced by one half, they were not so low as to prevent the tenant remaining at a rent of nearly 1*l.* per acre. The farm he should not have considered very favourably situated, being five miles from a railway station and ten miles from Colchester; but

the land appeared to be good, because the average production was 38 bushels to the acre, as against the average for the whole country of 28 bushels. It would be very desirable to know how the occupier had been able to meet the difficulties of falling prices, by change of cultivation or otherwise. It was obvious that an adjustment might be made in several directions. The rent might be reduced, and in this case it apparently had been reduced by one half. Then the wages might also be reduced, either in the amount given to the labourer, or in the aggregate amount expended. He gathered from the figures that that there had been no reduction in the actual wages to the individual labourers; indeed, they had been considerably increased. As Mr. Read had well said, the individual labourers on that farm must be in a much improved condition compared to fifteen or twenty years ago. But on the other hand there had been some reduction in the aggregate wages paid, probably in consequence of the smaller proportion of land under arable cultivation; but without the further information as to profit, it was extremely difficult to form an opinion from this one case how a farmer might hope to secure for himself a reasonable and fair profit. Looked at generally, this case showed that one must not judge the condition of the whole county of Essex from the south-eastern part of it, as described by Mr. Pringle in his very interesting report. No doubt that part of the county had suffered very greatly by the recent depression in agriculture, and a great deal of land had been reduced in value from 30*s.* to 5*s.* or 10*s.* an acre. But that was not the condition of other parts of Essex, as was shown not only by the present case, but also by the evidence of a farmer near Chelmsford before the Agricultural Commission, which led to much the same conclusions as this paper. That farm was one of 1,600 acres, the soil was a porous and chalky clay, cultivated mainly as arable land; and by close application and economy the tenant had made some profit even during the last few years, and many other farmers in the district were doing the same as himself. As much labour as as ever was employed on the land. He had never paid less than 1*l.* an acre rent until 1895, when it was reduced to 17*s.* He attached the greatest importance to freedom of cropping and freedom of sale, and he sold straw and clover hay on the London market. He did not rigidly adhere to the four-course system, but turned his attention a good deal to feeding bullocks. He also sold 185*l.* worth of poultry in the year, and considered they paid better than anything else. This all tended to show that by altering the system of cultivation, not adhering to the four-course system, and by paying more attention to the smaller items of the farm, such as poultry, much might be done to meet the difficulties caused by the fall in prices. They would also have been glad of further information as to the effect of the recent rise of prices which had undoubtedly taken place during the last few months in almost all agricultural products. He had taken the prices given in that week's "Economist," and compared them with the prices of last September and of March, 1895, which was about the lowest point, and found them to be as follows:—Wheat was now 40 per cent.

higher than two years ago, and 20 per cent. higher than in September last; barley was 15 per cent. higher than two years ago; oats had increased considerably in value; prime beef was 5 per cent. more than in March, 1895, and 8 per cent. more than in September, 1896; mutton 20 per cent. and 15 per cent. more than in March, 1895, and September, 1896 respectively. In all these articles there had been a considerable rise within the last few months, and an even greater rise as compared with two years ago, and he should be glad to know how far this had altered the conditions of the farming accounts such as those which Mr. Danvers had laid before them. He was unable to agree with Mr. Bear and other speakers that the subject of options had anything to do with the fall of prices. He wished he could think so; for he had no sympathy with such gambling transactions, and it would not be difficult to put a stop to them if they had the effect Mr. Bear believed. But for every seller there must be a buyer, and it seemed to him that this system was as likely to raise prices as to lower them; but in fact he did not believe it did either one or the other. No doubt the main cause of agricultural depression had been the fall of prices, and many explanations had been given of that. Some people thought it was due to the appreciation of gold, but he believed it was mainly due to the great increase of production and to the great reduction in the cost of transit. What they had to look forward to in the future as to prices no one could predict; who for instance could have predicted in July last the great rise in price of wheat which occurred in the autumn? All they could hope was that the present rise which began in September last might be maintained. The rise of wages which undoubtedly began in 1873 and 1875 throughout the greater part of the country, had been maintained, and in some parts even increased. He admitted that in some parts of the east of England there had been a fall, but taking the whole country the position of labourers was unquestionably better than it used to be, largely owing to the fall in prices of all the commodities they consumed, and there was every indication that the improvement would be maintained. They must appreciate the fact that the agricultural interest had to some extent gained by the reduction in the price of artificial manures and feeding stuffs, and he would conclude by expressing the hope that farmers with the adjustments already made and those to be made, if necessary, might still be able to secure that fair profit to which they were legitimately entitled.

Savings Banks *at* Home *and* Abroad.

By Henry W. Wolff.

[Read before the Royal Statistical Society, 27th April, 1897.
The President, A. E. Bateman, Esq., C.M.G., in the Chair.]

No particular pleading should be needed to commend my subject to the interest of statisticians and economists. Whatever persuasion may have been necessary in the days of our early pioneers, Dr. Duncan and Priscilla Wakefield, at the present time the inestimable value of a well-regulated machinery for the collection of popular savings is thoroughly appreciated all the world over, in its double aspect, alike as a potent philanthropic agency for raising the poor, and as a great national banking office placing large sums at the disposal of the community. In our own country savings banks have, in very truth, run a course of triumph. Beginning humbly, in out-of-the-way villages, they have overspread the three kingdoms, and indeed the empire. For nowhere do we set up our standard on new territory, but we carry with us this economic mark of civilisation, developing by regular stages from a minute special department in the Colonial Treasury to a well-organised net-work of savings banks, as at home. Our own special invention, the Post Office Savings Banks, may be said to have conquered the world. France has adopted them; so have Italy, Austria, Hungary—Russia, Belgium, and Roumania after a fashion—Sweden, the Netherlands, Portugal, Egypt (through French agency), Japan, Canada, the Cape, most of our Australasian Colonies, India, the Bahamas, Ceylon, Sierra Leone, British Guiana, and even the Sandwich Islands. Switzerland still protests that it does not want them. But the United States are evidently preparing to graft the European shoot upon their own economic system, and even in Germany influential voices may be heard pleading for an imitation of England in this matter. In the United Kingdom, in spite of restrictions which savings bank managers know to be very prejudicially narrowing the channel of inflow, and although we are not by any means as thrifty a nation as we ought to be, we now have about 168,000,000*l.*[1] accumulated in regular savings, to say nothing of nearly 30,000,000*l.* laid up in friendly societies (much of which sum is indeed included in the

[1] The exact figure on 10th April last was 167,645,673*l.* –*s.* 6*d.*

former figure), of more than 4,000,000*l.* stored up in co-operative societies (deposits only), about half a million in military and seamen's savings banks, 55,000,000*l.* in building societies, and not a little in penny banks and other provident institutions. The Yorkshire penny bank alone holds about 10,000,000*l.* in small savings! Here is good work done, without doubt—work which leaves the nation, not the richer only, but also the better fitted for future progress! For no man is enrolled for any time among the depositors in savings banks, who does not become to some extent a man of business, as well as an incipient capitalist, endowed with the instinct of getting on, of laying by, and with something of a capacity for business-like calculation. And, whatever barriers may still stand in the way, our national savings increase steadily, at the rate of about 11,000,000*l.* a year. Reckon up the figures which I give elsewhere, incomplete, and to some extent belated, as they are, and you arrive at a grand total of more than 1,400,000,000*l.*, as representing the collective savings of what may, roughly speaking, be termed the civilised world.

There is, indeed, in our own country—as both the Chancellor of the Exchequer and the "Times" have been careful to impress upon us more than once—a reverse side to this attractive picture. The poor man's gain is alleged to have become the loss of the community. And though that assertion can be conclusively disproved from official figures, there is no gainsaying the fact that the extraordinary accumulation of savings has caused serious embarrassment both to the Treasury and to the rich investing classes, more particularly the bankers. It is altogether untrue, as I would ask to be allowed to point out, that our savings banks have actually caused the country a loss—except that "original sin," resulting in a wasteful outflow of gold, which was "staunched" in 1877, to be wholly stopped in 1880, being attributable to the fault, not of the savings banks, but of various governments which, *of their own accord*, credited those banks with a higher rate of interest than the country could afford. Even that loss has been, so the testimony of both Mr. Gladstone and the late Lord Iddesleigh proves, made good "ten times over" by economies which the possession of large sums of savings banks money has enabled the government to carry into effect—in the conversion of debt, in the construction of fortifications and otherwise. Beyond that there has been nothing but gain. The savings banks of both types have, within the past twenty years, earned the government 1,588,878*l.* of net profit, in comparison with which the first loss actually sustained since, in 1877, the Treasury on its own proposition undertook to face the risk of gain or loss, constituting itself the savings banks' "banker"—a loss of only 19,638*l.*—

attributable, once more, not to savings banks mismanagement, but to government hesitation to invest moneys for which it had bound itself to allow interest—is a mere fleabite. Write that 19,638*l.* off the 1,588,878*l.*, and you still remain 1,556,240*l.* to the good. To that gain you must add the million or two, at least, of money accruing from surpluses on which for many years the Treasury has allowed no interest, the increase in value of much of the 168,000,000*l.* of consols which is still accounted for to the savings banks at its purchase price of 90 odd, or, it may be, par—whereas it is worth 112—the balances appropriated from trustee banks closing their doors,[2] and other items, such as gains upon the valuation of Local Loans stock—in respect of which, on the testimony of Sir Rivers Wilson, the Chancellor of the Exchequer "did very well indeed[3]"—and you will find that the savings banks, instead of being the alleged running sore, have in truth proved to the Treasury a rather richly yielding milch cow. However, present embarrassment undoubtedly there is. Thanks to our very cautious legislation, all savings banks moneys must needs go into Consols. And 168,000,000*l.* of such funds unquestionably make a big hole in 589,146,878*l.*, or even, if you take the gross total of our Debt, in 652,540,105*l.* When we first decided to invest in consols, in 1817, our Debt stood at 900,000,000*l.*, the "three "per cents" were quoted at 80, the "four per cents" at less than par. We were to all intents and purposes still a borrowing nation, and wanted a market for our stock. We have long since become a repaying nation and, so far from wanting a market for our consols, we very urgently want consols for our market. Savings banks purchases—more than any other demand—have driven up consols to what the "Times" has rightly called "famine price." Consols are no longer to be had in sufficient quantity. That is the crux of our present difficulty. We find the same thing at work in other countries—but only to the precise extent to which they have adopted our own "one-horse" investment scheme. More than at any other time then must a review of the foreign systems for the collection and administration of savings, for comparison with our own, be of interest to us at the present moment, while we are thinking of setting our savings banks house in order and are talking of further restrictions and limitations. In the space of a paper to be read before you I can review those systems only very

[2] To state an instance, one out of many, last June the Trustee Bank of Ipswich was wound up, closing with an unclaimed balance of 3,583*l.* 4*s.*, which was carried to the Treasury. Out of that the National Debt Commissioners allowed 1,331*l.* 11*s.* 2*d.* compensation to officers, keeping the 2,251*l.* 12*s.* 10*d.* balance for themselves.

[3] Report of the Committee on Trustees Savings Banks 1888. *Q.* 1363.

superficially. I propose to touch only upon the most salient points, such as are likely to interest us in view of our problem.

But first let us very briefly glance at the development of our own system and the shape which it has actually taken.

Our system is specifically what the French call *étatiste*. The State has in course of time constituted itself the sole guardian, the receiver, administrator, and repayer of savings. We have adopted this plan, avowedly, for the sake of security. The legislation still governing savings banks is so much specifically Mr. Gladstone's, that we may well look to his speeches of "the "fifties" and "sixties" as explaining its aim. Our trustee banks began in freedom, like the great private savings banks abroad, which collectively do an incomparably larger business than the post office savings banks of their several countries. In respect of investment, trustee banks in this country have never made a loss to speak of, even while enjoying their most unfettered freedom. Mr. Gladstone has publicly found fault with Mr. Sotheron Estcourt's Committee of Enquiry (of 1858)—a committee composed of most capable men—for directing their attention almost exclusively to the question of the *administration* of funds. That was not the point at which at that time the shoe pinched most. Investments had proved safe. But there had been defalcations and frauds. Mr. Gladstone's object was, to secure depositors absolutely against loss in the collection of funds. He suggested official "treasurers" and "receivers," to take charge of the deposits and, when the trustee banks declined again and again to listen to his proposals, he took the bull by the horns, and, adopting a suggestion made as long ago as 1807 by Whitbread, and repeated in 1827 in the "Quarterly Review" by Jeremy Bentham, he set up his post office banks, practically as a rival institution destined—as in official opinion they still appear held to be—in due course wholly to crowd out the older establishments. Mr. Gladstone, in his own words, desired to make the Treasury "the "banker" of the savings banks, the guardian, who would take 1*l.* and repay exactly 1*l.*, plus interest. In respect of one point now brought much to the fore, Mr. Gladstone's successors have turned almost completely round upon Mr. Gladstone's own original line of policy, namely, in seeking to make the Treasury rather the depositors' "broker," negotiating a sale of consols for the depositors' own holding, and so they appear labouring to bring about precisely the result which Mr. Gladstone of all others desired to avoid, that is, a fluctuation in the value of depositors' deposits. Depositors, however, will not buy stock, just *because* it fluctuates. Partly, at any rate, with a view to overcoming their aversion, our Parliament has introduced the "automatic investment clauses,"

which *make* them. The measure is, however, of very little practical effect. Our "stock investments," never popular, keep steadily declining, and the "automatic investment clauses," which deprive savings banks of their best balances—those which pay for the small ones—are a standing grievance to managers. Not content with such constraint, the National Debt Commissioners have, by an exercise of their own authority, in the teeth of an opinion to the contrary given by the present Speaker, taken away from the trustee banks the power of investing in *loans* to public rate-levying bodies, and insisted upon such loans being negotiated only by the purchase of fluctuating stock. In addition, they are accused of making their interference so irksome to trustee banks, that in self defence the Glasgow Bank, the largest which we have, has, after a long but unsuccessful resistance, forcibly broken away from its hampering leading strings and set up an independent savings investment trust by its side, under the Companies Act, which can snap its fingers at the Commissioners. It will be odd if the example is not followed elsewhere, because this "taking "refuge" under another Act gives the trustee banks all that they want to be able to act as they would wish to do. The present restrictions cramp savings banks at all points. Under the "consols "system" interest is bound to go down, because we are deliberately raising the price of our security against ourselves. And, to weaken still more the magnetic force of our savings institutions, our maximum limit makes it absolutely impossible for us to collect anything like all the available savings. In a trustee bank, of which I was at one time a manager, we held in deposits under the present limits only just a third of what we might have held, and what it would have been to the advantage of our town if we had held. As we could not take it, the remaining two-thirds went for the most part into the "Balfour Companies" and were lost. Then, can it be said that we require further restrictions?

Now let us look abroad. The country standing nearest to us in this matter is France. It has proceeded almost *pari passu* with ourselves, legislating in practically the same way, and at the same periods, first permitting investments in *rentes*, as a boon, then, when the Empire wanted money, turning the favour into a command. In the amount of saving done France stands pretty much on a level with ourselves, holding (at the close of 1895) about 165,000,000*l.* (apart from *rentes*) in balances, on approximately the same population. Only a comparatively small portion of this business (less than one-fourth) is done in Post Office Banks, which appear copied from our own, and, barring a difference in limits—which is to some extent met by a more frequent evasion of the law—and a higher rate of interest allowed (by $\frac{1}{4}$ per cent.),

are organised on exactly the same lines, *except in one very essential particular*. The French Savings Banks are not, like our own, tacked on to the Treasury. They are subjected to the control of the Ministry of Commerce, which of course is in no wise interested in the sale of consols. Their moneys are administered as a special fund, the surplus remaining their own and being scrupulously carried to reserve, where it may be used to meet casual deficiencies. At the close of 1895 the Post Office Savings Banks Reserve Fund stood at 5,867,705 frs. It is much appreciated as a "buffer" to break the force of sudden fluctuations. And, moreover, French savings banks moneys are administered, not by National Debt Commissioners, but by the *Caisse des Dépôts et Consignations*, which is really an independent, though official, body of trustees. Nearly four-fifths of the entire business (as is shown by the 3,395,460,185 frs. balances remaining on the books at the close of 1895) is done by the old "ordinary" banks, which have retained far more of their hold upon the population than our trustee banks; partly because the majority of them (457 out of 544 in 1895) are "municipal"—run by corporations, and the others have grown remarkably strong; partly because they have always been allowed to pay a rather higher interest than the Post Office Banks, though the *Caisse des Dépôts et Consignations* credits them interest at the same rate, viz., $3\frac{1}{4}$ per cent. The French Savings Banks have recently been held up to us, rather provocatively, but very infelicitously, as will be shown, as an example to follow, in virtue of the very low limit which they have quite lately fixed as a maximum for savings, viz., 1,500 frs. The limitation of deposits is one of the most questionable points in all savings bank organisation. It seems to say: Be not saving over-much; save just enough to acquire a taste for saving, and then stop! If the banks are managed on businesslike lines, so as to be kept self-supporting —which, of course, they should be—there can be no occasion for a limit. If, on the other hand, a loss is made, then either the business should be stopped or else the interest should be lowered. If the risk of a "run" becomes too serious for the custodians, then the burden should be distributed among a number of bodies, just as it is among insurance companies. In France the limit has been changed so often that there is no telling how long it may remain at 1,500 frs. In 1851 it stood at 1,000 frs., but it has since been up at 3,000 frs. The first effect of the recent change has certainly not been encouraging. In the Post Office Savings Banks the deposits of the first five months after it came into force showed a falling off of something like 28,000,000 frs., compared with the deposits of the corresponding period of the preceding year; that is, instead of the deposits exceeding the withdrawals by

20,149,686 frs., as had been the case in 1894, the withdrawals exceeded the deposits by 7,617,641 frs.; and 58 among every 100 new depositors closed their accounts. In the "ordinary" savings banks the increase both in the amount of deposits and in the number of receiving offices, which was previously marked, has been practically brought to a standstill. And it deserves to be noticed that it is just the *small* depositors, working men and the like, whose number has proportionately decreased. The proportion of "chefs d'établissements" and "professions libérales" show an increase. The 60*l.* limit has therefore not worked at all satisfactorily for the depositors or for the encouragement of saving. It was avowedly introduced to relieve the Treasury, which found that it had been too greedy in claiming all the money, and had swallowed more than it could digest. The present limit is seriously complained of by savings banks managers as hampering them in the collection of small deposits. It is the large deposits which enable the banks to take the small, since the latter involve a loss. "Les petits livrets," so says the official Report for 1891, "sont une "lourde charge pour les Caisses d'Épargne; elles ne trouvent pas "dans le produit qu'elles en retirent le montant des frais que cette "gestion leur occasionne; les forts livrets sont nécessaires afin de "procurer à ces établissements les ressources indispensables pour "équilibrer leurs dépenses avec leurs recettes et assurer leur bon "gouvernement, et même leur existence." We find exactly the same thing over here. Before one of our Parliamentary Committees, Mr. Meikle stated, on behalf of the great Savings Bank of Glasgow, that 100,000 of the smallest deposits held in that bank, averaging 8*l.*, cause the bank a loss of 5,000*l.* annually, since they pay only 2,000*l.* but cost 7,000*l.* That is about the most economically managed savings bank in the Kingdom, which leaves the local Post Office Banks "altogether out of the race." On this ground alone it is doubtful how long the French will be able to maintain their present narrow limit. However, concurrently with that questionable limitation, another very important change was adopted in France, which more than counterbalances the loss occasioned to the savings banks by the limitation. The new law appreciably widens the scope assigned to the *Caisse des Dépôts et Consignations* for investment. It allows it to invest savings bank moneys at its discretion in municipal and county stock, stock issued by Chambers of Commerce and Crédit Foncier debentures (mortgage bonds),[3] and to lay out one-fifth of the savings banks reserve fund (the common fund in its own hands;

[3] "En obligations négociables et libérées des départements, des communes, des "Chambres de Commerce, du Crédit Foncier."

for the "ordinary" savings banks have separate reserve funds each in addition) in improved working-men's dwellings. It allows the "ordinary" savings banks to invest their own capital—share capital and reserve; the reserves are ample—in securities of the same description, as well as one-fifth of that amount out of their deposits in loans to co-operative societies, building societies, People's Banks, Monts de Piété, and other institutions of recognised utility. "Ordinary" savings banks have still the privilege of regulating their rate of interest according to their income and expenditure, paying more than the Post Office Banks when they can afford to do so. They may, in addition, wherever their share capital represents at least 2 per cent. of the deposits held, distribute one-fifth of their annual profits in bonus interest among depositors of accounts not exceeding 500 frs. (That limit is complained of.) Beyond this, they are directly represented on the *Commission Supérieure*, created to share with the *Caisse des Dépôts et Consignations*—it is a body entirely distinct from the official Committee of Inspection—the control of general savings bank administration. They elect their members on that Commission. Its chairman in the present year is the President of the great Savings Bank of Paris, M. Denormandie. Here are concessions to freedom wrung from the Government, not only by the continued spirited agitation in favour of independence led with great ability by M. Rostand, but also by the even more convincing logic of facts, which enable the banks to put up with a loss of 20*l.* on their limit. In France, as in England, though not to the same extent, the exclusive purchase of *rentes*, or consols, has led to something of a "famine" price and a dearth of *rentes*. And, reasonably enough, the Chambers have sought to meet the difficulty by opening a door for other investments, which promises to be opened more widely, and giving a little more free play to the judgment of local administrators.

The purchase of *rentes* in small amounts is another feature in French political economy which is often held up to us rather stimulatingly for imitation, and is, curiously enough, but quite wrongly, connected with the savings banks system in force. No doubt, from the days of Delessert downward, it has been one of the pet objects of French Savings Banks managers and ministers to induce depositors to invest in *rentes*. They wanted a market for their consols; therefore there was some reason in their pressing small people to buy them. But the purchases negotiated by the Post Office are disappointingly trifling. "Les achats de rente faits par "les Caisses d'Épargne pour le compte de leurs déposants restent "toujours très limités, les déposants, pour diverses raisons, se montrant généralement peu enclins à convertir en rentes le montant de

"leurs dépôts." Even the recent reduction of the maximum limit has produced only a very feeble effect in this direction, forcing up, in the Post Office Banks, the annual sales from 2,262,318 frs. to 3,050,902 frs., in the "ordinary" banks from 1,730,841 frs. to 2,395,420 frs. (apart from "automatic investments"). In Belgium, the reduction of interest on amounts exceeding 3,000 frs. has proved a little more effective; but even there the result is really small. It tells seriously against what we know as "automatic" investments, the investments made *ex officio* of excess balances, that they are in France shown to be made at unremunerative prices, yielding an interest comparing with that netted on investments made entirely at the depositor's own option, as 2·99 to 3·15 per cent., 3·15 to 3·47, and so on. Léon Say—who is often held up as a model political economist, and who was distinctly in favour of "free" savings banking, protesting against the independent savings banks being turned into mere "guichets" of the State office—distinctly deprecated this *rente*-buying business. His collaborator, M. Lacombe, writing in Léon Say's "Dictionary of Political Economy," lays it down that savings banks go altogether outside the sphere of their proper business in prosecuting it. The larger number of small holdings in *rentes* is in France entirely due to the progressive lowering (since 1822) of the *coupures*, at the latest stage to 3 frs. (income).

I pass on to Belgium, which furnishes very instructive material for study. Its *Caisse Nationale d'Épargne* is considered one of the best managed savings banks in Europe. Belgium began with *étatisme*, much of our sort. And, as a consequence, in the revolution of 1848, it found itself "in a very tight corner." It recast its law. Its *Caisse Nationale*, which almost monopolises the savings business—the few "free" banks surviving can scarcely enter into account; but the *Banques Populaires* take rather substantial savings—is a State institution. But it is carried on entirely on its own account, not for the redemption of debt, but benefiting itself by the profits made. It has had the problem of low interest to contend with in a falling market, and, yielding to pressure, has gradually reduced its rate on the larger sums. Since 1894 it pays only 2 per cent. (in the place of 3) on deposits (the *whole* amount) exceeding 3,000 frs., not binding itself to invest the over-plus in *rentes*, but reserving to itself the right of doing so. The immediate effect has been, to increase the savings banks investments in *rentes* by 5,000,000 frs. (200,000*l.*). However, the number of depositors has gone down from 93,231 (in 1894) to 91,709 (in 1895), the savings bank balances have dwindled from 37,000,000 frs. to 26,000,000 frs., and the average

value of the pass book has shrunk from 406 to 396 frs. The change has accordingly acted as a distinct deterrent to saving—by which I have little doubt that the *Banques Populaires*, offering a more attractive depository, have profited. Otherwise the bank is administered on decidedly liberal non-*étatiste* principles. It enjoys absolute freedom of investment—and it uses it. Among its total investments, in 1895, it held only about one-third in public securities, employing nearly one-fourth of its money in discounting acceptances, and investing the balance in mortgages and municipal and company bonds, and in advances to building societies, to co-operative agricultural banks and to similar institutions. The late Director, M. Mahillon, laid particular stress upon the holdings in readily convertible commercial paper, more especially foreign, as providing a powerful safeguard to his bank, and constituting a main cause of its strength, more especially in the trying crisis of 1870.[5] The foreign acceptances then set free at once all the money that was wanted. There is another noteworthy feature about the Belgian savings banks, which, as it happens, we find reflected in the Trustee Bank of South Australia, the Government Savings Bank of Portugal, and some Savings Banks in the United States. Every five years the bank shares out as much of its ample resources as it can safely spare, among its depositors of sufficiently long standing. Thus, in 1891 (I have not the figures for 1896) it distributed 1,533,718 frs. among depositors. In England that money would have gone to the Treasury.

The example of Germany and Austria is even more instructive than that of Belgium; for it shows decentralisation applied in a manner which seems to suggest that for once we and the Germans have changed parts. The Germans are the self-governors and we are the State-ridden. Most of the savings banks in Germany and Austria are worked by local bodies—towns, "circles," provinces, and "estates"—that is, by local bodies exercising the power of levying rates, self-contained fragments, so to speak, into which the State is cut up. Under this system the security offered to depositors is absolute—it is even, in some respects, greater than that offered by the State as a whole, because, as Sir A. Arnold has recently pointed out with respect to London County Council stock,

[5] M. Mahillon's view is altogether supported by what the Italian Ministry of Agriculture, Industry, and Commerce says (p. xi) in its last official report, on the best employment of savings bank funds:—"È noto che l'impiego migliore del "denaro è sempre il portafoglio, purchè *ottimo come qualità, a breve scadenza*, "e, come natural conseguenza, *liquidabile immediatamente*; mentre il titolo, com- "unque solido, è sempre esposto ad oscillazioni che, se pure non grandi, sono "sempre imprevedute e imprevedibili nella loro misura ed espongono quindi ad "eventuali sorprese in una liquidazione immediata che sia imposta dal panico, "provocato dalle improvise domande di rimborso nei momenti di crisi."

the credit of local bodies is less likely to be affected by political crises. And, thanks to such organisation, the savings banks find themselves assisted in their work by a spirit of local patriotism and pride in local institutions on the one hand, and by direct acquaintance with local circumstances on the other; they are in consequence more adaptable to circumstances. The system has worked admirably, and all the more so since, under the circumstances indicated, the savings banks could be, and have been, allowed absolute freedom with regard to the employment of their moneys, subject only to government approval of their general "plan" of investment, which allots so many per cent. to State securities, so many to mortgage securities, so many to loans on personal security, and so on. By this means not only are savings banks enabled to earn considerably better profits, to the benefit of the depositors, but their machinery is also turned to a new use, and the banks have become extremely serviceable, not only for collecting but also for distributing moneys, for *fructifying* purposes. They are even put into requisition to liquify once more the huge sums injudiciously fixed in hopeless unproductiveness in the coffers of such bodies as the Old Age Pensions Department. Those offices must not lend directly for industrial or agricultural purposes. (Since a few years they may lay out a small part of their funds in working men's dwellings.) The savings banks form a convenient and most appreciated link between the heaps of gold stored up and their fructifying employment. They lend freely on personal security, and, as I am assured in all quarters, as good as never make a loss. There are independent banks as well, corporations, or joint stock companies—the old savings bank of Hamburg holding its 2,400,000*l.* of deposits, that of Dresden holding 3,200,000*l.*, that of Frankfort 2,600,000*l.*, and the two large banks of Austria, Prague with about 10,000,000*l.*, and Vienna with 20,000,000*l.* of deposits. The rate of interest varies considerably, and very many banks have absolutely no maximum limit. Savings banking is made purely a matter of business, in which it is understood that no profit is to be realised, but a substantial reserve fund must be accumulated. Allowing for the ample sums deposited with the people's banks, which in Germany are at the height of their activity and prosperity, the sum of 212,536,500*l.* held in that country at the close of 1894 seems a considerable accumulation.

Hungary would, as M. von Jekelfalussy explains in his interesting volume on the Hungarian "Millennium," no doubt have had municipal savings banks like Germany and Austria, had it, like them, possessed municipal self-government before the day of Count Beust. As it is, the work of collecting savings has fallen

for the most part into the hands of joint stock companies, not all of which have adopted a self-denying ordinance with regard to dividend. Their business will presumably be materially trenched upon in the future by the new Post Office Savings Banks, which appear to be extending their operations fast, and which, together with the congenerous savings banks of Austria, form a highly interesting feature in the economic organisation of the Hapsburg monarchy. Powerful as is the banking interest both in Austria and in Hungary, dread of it has not deterred the Legislature from carrying the principle of popular banking, which lies, of course, at the bottom of all savings bank work, far beyond the application given to it elsewhere. Not content with making the Post Office Savings Banks handy deposit institutions for the poor, the Austrian and Hungarian Legislatures have turned them to account as *drawing* and *transmitting* banks as well. And the new business has proved most attractive and successful. Its convenience is generally appreciated, and nobody seems to complain. Accordingly the business is rapidly spreading, and has already became international. The Post Office Savings Banks of course possess this advantage, to start with, that they have, so to speak, their own "clearing house" ready made, and can therefore transmit assignments in large volume without actually moving money. Every account has to be secured by a small fixed deposit (the minimum is 8*l.*), on which interest is allowed, as on other balances in this department, but at a lower rate than upon savings. The Post Office has the right to refuse to take accounts, and also to close them, should it have reason to complain of its customers. It repays itself for its work by small fees levied upon transactions and a halfpenny stamp taken upon each cheque. The turnover in this department is considerably larger than in the savings department. The difference in respect of the balances carried over is not equally great. One more peculiar feature of the Austrian and Hungarian Post Office banking deserves notice. It is this—that rural letter carriers are employed to collect deposits on their beats. The official Report directly attributes much of the rather striking increase in deposits, standing to the credit more particularly of juvenile depositors, to their vigorous exertions.

One brief word of mention is due to the savings bank system of the Scandinavian kingdoms. Its characteristic feature is: perfect autonomy of the banks (apart from the Post Office Banks of Sweden), coupled with *stringent control* and the power of summarily closing insolvent banks. In Denmark freedom is carried to the furthest limit. There the Government takes particular care to make it understood that it is absolutely not in any way responsible for savings banks and their deposits. And this

absence of official connexion seems generally understood. Nevertheless the figures given in the Inspector-General's Annual Report show that the little kingdom with its tiny population of barely 2,200,000 holds in savings the almost incredible amount of about 30,000,000*l.*, not very much less than all colossal Russia. The savings bank of Copenhagen alone has nearly 6,000,000*l.* in its custody, as much as the large Savings Bank of Paris. If a tree may be judged by its fruits, here is something to be proud of. One particular noteworthy feature in the system of Scandinavian Government control is this, that upon a balance sheet showing a *bonâ fide* deficit of 5 per cent. on the deposits, the Government is entitled mercilessly to wind up the defaulting bank.

Switzerland has kept its savings banks as independent as Denmark, without introducing similar supervision, or anything like it, until quite recently. Of late years some cantonal governments have taken power to inspect. The result is about as satisfactory as in Denmark, for at the close of 1895, the Republic held in savings about 36,000,000*l.* to its 3,000,000 inhabitants. It is, however, not certain that all this accumulation represents *bonâ fide* saving, and to some small extent, at any rate, the amount is artificially swelled by an overflow from France—the natural consequence of excessive limitation of maximum deposits in that country. Of the 4,855 new depositors bringing their money to the Savings Bank of Geneva in 1895—the year in which the reduction to 1,500 francs took effect in France—1,939, that is 40 per cent., were French. There may be a warning in this, perhaps not to ourselves, removed as we are by our silver streak from the sources of possible competition, but to Continental States which, like France, are intent upon relieving the Treasury at the cost of would-be savers. The Swiss Savings Banks thoroughly understand it to be their task to make their money fructify after having first collected it. When they began work, they were in this unique position, that their country had no National Debt for them to invest in. No Treasury has stepped in since to claim their money as a forced loan. The banks accordingly remain free. More than half the funds collected go into mortgages, a further quarter into advances on securities. Very little is invested in debentures, bonds, and the like. Much is lent at a low rate of interest to philanthropic institutions and other establishments of public utility. So the money fructifies. "There is nothing more "full of life or more indicative of prosperity than savings banks "which truly understand their task."[6] So writes M. Guillaume Fatio in his prize essay on Swiss Savings Banks, institutions

[6] "Rien de plus vivant, rien de plus prospère, que les caisses d'épargne qui "comprennent leur tâche."

which in virtue of profitable employment still manage to pay their depositors $3\frac{1}{2}$ per cent., and which live on, solvent and sound, from 1787, 1805, 1809, and other early dates. For all the principal banks are of old foundation. One feature particularly worthy of remark about Swiss popular economy is the large amount of saving going on among *young* people. It is in part the result of the educational system adopted, which is known to be as excellent as it is democratic. Every child is taught to save at school. Its *centimes* and *rappen* find their way surely enough into some money box or other. People's banks, saving societies and "compulsory" savings banks take over the young folk emerging from their first youth, and teach them to save to better purpose, in a manner which has the advantage of *fixing* their savings where they are not likely to be squandered. Everybody helps to stimulate thrift. The Canton of Neuchâtel has a volunteer agent of the local savings bank, acting for it, in every hamlet.

Italy is, as I should like to point out—since the fact is not generally realised—the original home of savings banks. Centuries before Priscilla Wakefield and Delessert set up their little pioneer banks in Tottenham and Paris, S. Barnabas of Terni and his brother Recollects gave to Italy those useful institutions, the *Monti di Pietà*, which were not only pawn shops, but popular banks as well, and more particularly savings banks. The *Monte di Pietà* of Rome in course of time became an especial favourite with the depositing public, alike the rich and the poor. Thus were the means found for helping the needy with loans, so to speak, from their own resources. The same system still survives in France, at Nancy (it was in force up to a few years ago at Avignon), in Spain at Madrid—a large bank holding about 2,000,000*l.* in deposits—at Barcelona, and in other towns, and almost throughout Brazil. In Italy we have a specimen of this old type—which was otherwise finally suppressed in 1887—surviving in the useful and admirably managed *Monte dei Paschi* of Siena. Since 1875 Italy has Post Office Banks. I am anxious to point out that the country owes them to M. Luzzatti, who prepared the scheme under Sella, and who is at the same time the creator of the Italian *Banche Popolari*, and the declared patron of ordinary savings banks, besides being a very serviceable friend, more particularly at present, in his second term of office as Minister of the Treasury, to the commercial banks. Nowhere is there less of that dog-in-the-manger jealousy between deposit institutions, which in some other countries stands so much in the way of their healthy development, as in Italy. Why bankers should dread savings banks or people's banks, and look upon them as rivals, I have never been able to understand. As well might a

university be jealous of elementary schools, or a regimental adjutant of the recruiting sergeant. They are feeders, not foes, economic go-carts for economic children, trainers preparing folk for banking custom. In Italy the savings banks were the very first to help the co-operative people's banks and put them upon their legs. They saw their own advantage in this, as well as their duty, and helped them readily and effectively. I have been at special pains to trace in Italy whether one kind of saving has trenched upon another. I have been to the directors of the great savings banks—Milan, which holds 20,000,000*l.* in deposits, Bologna, Cremona, Imola, &c., all of them places in which co-operative banking is strong. The directors have fetched out their books and shown me that there had been no loss to themselves. New facilities had produced new savings. It is precisely the same thing with the Post Office banks. The Post Office Banks hold in Italy a large number of very small accounts. But these only represent about a fifth or a sixth of the entire amount deposited. "We do not wish the Post Office Banks to hold more." So the late Postmaster-General, M. Ferraris, explained to me at Rome. "We do not want to interfere with the work of the other "banks which, being independent and self-governed, local and the "outcome of local enterprise, ought to be allowed to do all that "they can. We simply want to stand in reserve, so that no man "may be able to complain that he has not a savings bank within "reach." The words quoted from M. Fatio's book with regard to Swiss Savings Banks apply to the very letter to the Italian, whose praise I need scarcely sing, seeing that it has been sung with far better effect than I could give to my laudations by Léon Say, who was a particular admirer of these useful Italian Savings Banks, which send the money saved in the shop or on the farm back to the shop or the farm to earn more, giving seed to the sower and bread to the eater, before it returns "not void" to the source from which it first came. It seems an ideal picture of savings banking.[7] There is, indeed, a warning reverse side. Wherever local patriotism, so to call it—local interest in the bank—is not strong enough to lead men of the best quality to come forward freely and undertake the management, as a labour of love, the banks are apt to fall into decay. M. Laurent quotes a long list of insolvent banks which had to be wound up; and the Statistical Office of Italy in its Report lengthens the catalogue.[8]

[7] The Government has, however, very stringent powers of inspection, and may wind up a savings bank which does not comply with the rules or is shown, upon inquiry, to be insolvent.

[8] The official report for 1893 shows no fewer than twenty-eight ordinary savings banks to have made a loss, the total deficit amounting to 708,031 lire = 28,000*l.*

However, this is a case evidently of "Abusus non tollit usum." Because there are Messina, Sarzana, Barletta, &c., it does not follow that we should not maintain Milan, Bologna, Verona, any more than we should wind up Glasgow and Liverpool because we have had to wind up Bilston. Wherever there is a congenial environment and scope for such free local banks, they seem indeed to represent the beau ideal of savings institutions.

Before I take final leave of my subject, I would ask to be allowed to cast just one hurried glance at the savings institutions established among our kinsmen beyond seas. Should any of us distrust continental example, here we have our own flesh and blood giving us the benefit of their experience, which on some points happens to differ not a little from our own. In the Crown Colonies Crown influence and the policy of restriction appear indeed to have in some places gone even beyond what they are in this country. For by the latest ordinances the prerogative of deciding what is to be done with savings is vested, not in the local government, but in the Secretary of State at home. Some ordinances go so far as to prescribe that not on any account shall any part of the funds collected "be *applied in any way* to the "purposes of this colony, or be invested in any loan of money to "be raised in this colony for any purpose whatever." In the self-governing colonies, on the other hand, we indeed find Government Banks and Post Office Banks, but both exercising far greater freedom than their counterparts in this country. Their accounts are in every case kept distinct from those of the Treasury; their surpluses are credited to themselves. The Cape Government, though at the present time it invests only at $2\frac{3}{4}$ per cent., is in a position to continue paying $3\frac{1}{3}$ per cent. on its Post Office banks deposits, because its older holdings in its own securities, paying at the rate of 4 and 5 per cent., enable it to do so. In Natal the Government is free to invest Government Savings Banks moneys in securities of *any* colony or dependency of Great Britain. In Western Australia the Post Office department may invest its funds in shares and in municipal loans, in mortgages—in mortgages up to 7,000*l.* on any one property. The limit was raised to that sum from 3,000*l.* in the last session, with the approval of both Houses. There was a strong feeling in favour of extending it still further, to 10,000*l.* The Prime Minister explained to the Assembly the great difficulty there was in investing savings bank money. There was then 300,000*l.* or 400,000*l.* awaiting investment. "Of that amount 220,000*l.* will go "for the Perth Waterworks" (how different from what we do with savings banks money in England!), "and then a considerable "amount will be left. The alteration of the law will lead to a

"larger amount being deposited." (There is no talk there of restrictions to reduce savings.) Mr. Forrest instanced, as a case showing the utility of freer investment, the loan made by the Post Office Banks to the city of Perth in taking up almost the whole amount of a debenture loan issued. The security continued good, the price of the debentures had gone up. The money earned the bank 5 per cent. In Tasmania the Post Office Banks are required to set apart 10 per cent. of their profits as a reserve fund, until 25 per cent. of the deposits is so accumulated. The department may lend out savings banks money on mortgages or otherwise on security. In New Zealand the Post Office Savings Banks Act gives the Government discretion to select investments. The number of such at present in force includes borough debentures, gas, harbour board, and river board debentures, besides a good many more. The independent savings banks of the colonies of course enjoy very much wider latitude. The two old banks of Montreal and Quebec are under no other obligation than to invest 20 per cent. of their funds in Dominion securities. The Directors of the Trustee Banks at the Cape are bidden to "lay out and invest upon such Colonial securities as they shall "think fit." A most interesting speciality in the way of investment is that allowed to, and readily practised by, the "Commis-"sioners' Savings Banks" in Victoria, which are really government institutions, since the governor appoints the Commissioners, and may remove officers, and since the colony is answerable for the deposits lodged. But they are administered, so to speak, as Trustee Banks. The Commissioners may invest in mortgages, in loans to corporations, and to shires and borough councils. Since 1894 they are also authorised to lend money to farmers, after valuation. The demand for such loans is rather considerable, and the practice is described as "a notable success." By 30th June, 1896, the Commissioners had lent out in all 151,257*l.* 11*s.* 8*d.* There was evidence to show that the money was being put to good use, and the payments for interest (5 per cent.), and sinking fund (2 per cent.), were being punctually made. Such employment of savings banks money has provided a new outlet for the "very "limited field open to the Commissioners for investment." "It "should not be forgotten," so the Commissioners add, "that the "value of farmers' loan business is reciprocal, as the Commis-"sioners must find profitable employment for the ever increasing "funds of depositors." Accordingly they appear resolved to continue and extend the practice.

Turning to the United States, we find that until quite recently savings bank business there was entirely free, unhampered, and unhindered by government interference or even supervision. Only

recently have some States begun to introduce measures of control. It seems likely that sooner or later, in consideration of their manifest convenience, Post Office Savings Banks will be introduced. Otherwise, if the amount of deposits collected, which the Comptroller of the Currency shows to have been at the end of October, 1895, nearly 400,000,000*l.*, may be taken as a test, the system pursued, which is practically that of conducting savings banking on a thoroughly business-like footing, but in entire freedom, has certainly not proved itself wanting in efficiency. It is true that the 400,000,000*l.* include deposits, the figures of which appear to indicate capitalist owners. The Americans, making sure of employing their funds well, will not hear of maximum limits. "The widening of the area of their operations, so as to embrace "the higher orders and a greater number of beneficiaries," so writes Mr. Edgar E. Werner, in his article on Savings Banks in the "Encyclopædia Americana," "has had a salutary effect. "Experience has demonstrated that these institutions lose none of "their efficiency as promoters of industry, sobriety, and thrift "among the poorer classes for the reason that others more "favoured are allowed to share in their benefit." My own impression, from what I have seen both at home and abroad, is rather, that the poor *like* to be depositors in banks in which they know that their wealthier brethren deposit. It makes the deposit institution more attractive in their eyes. It removes something of the *sous-entendu* stigma of poverty and of lower caste which might be held to cling to a bank reserved only for the poor.

The rapid survey which by your permission I have been able to take of savings institutions existing in various parts of the world, has presented to us the satisfactory spectacle of thrift extending and developing everywhere, quickened by a variety of methods rather striking considering that the work performed is really all one. Had I time to go into details, I could go on to show that the greater is the variety of methods called into requisition, the more competing agencies are brought into play, not only the greater but the more stimulating and satisfactory, and the more educating, is the result. The review brings home to us the truth of the maxim which our veteran savings bank manager, Mr. Meikle, of Glasgow, has laid down, to the effect that the real secret of success in all savings bank management consists in "facilities." I have heard Germans, Italians, French conversant with the matter sum up their experience in almost precisely the same terms. You cannot stimulate saving too much. If you would do good you must become all things to all men, "go into the highways and hedges "and compel them to come in," imitating the excellent educational system of Switzerland, in not leaving your pupils alone till

you have actually landed them, at the end of their journey, in the haven of modest capitalism, where self-interest and experience acquired may be relied upon to pilot them further. The Austrian country postman scouring his district for pence, the Italian Post Office taking stamps down to ½*d.*, the United States Savings Banks (and some agricultural banks in Germany) hawking about their savings bank counters, our own receivers of collecting banks visiting the factories and workmen's homes to snatch up coppers fresh from the paying-clerk's table, the German savings banks opening their doors—much as Mr. Bartley's Penny Bank does here—at the oddest possible hours, when working men have time to visit them—all these things help to teach practically the same lesson. We seem intent here upon having only one agency at work. Experience abroad goes to show that the more agencies are at work, Government Banks, Post Office Banks, independent banks, people's banks, working side by side, the more savings are gathered up in the large draw-net cast out to catch fish of all sizes.

Let us apply the lesson. We are talking of adopting further restrictions in our savings system, so as to make people save less, in order that we may be encumbered with less of their money. But do we really mean to discourage saving? Then let us frankly say so, and eliminate from our Savings Banks Acts the worn-out phrase, which will have become meaningless, about "the "expediency of encouraging thrift." The evidence which I have been permitted to lay before you of the doings of savings banks elsewhere is bound to suggest this reflection, that there may possibly be a better way open to us than that of narrowing the channel of inflow, and that is widening the reservoir. I do not say that the evidence is conclusive as referring to ourselves; but certainly it deserves consideration. After all, our child's ill health may be due not to any viciousness in the natural tendency which Providence has implanted into it to grow, but to excessive swaddling and binding up on our part, treating it like a German baby. There are two points, more in particular, which come out strongly in a comparison made between our own savings bank system and the systems of other countries. In the first place, scarcely anywhere outside the United Kingdom, except in Japan, Poland, Brazil, and more second rate countries, where saving is in its infancy, do we find the savings banks made subordinate to, and thereby necessarily subservient to the interests of, the Treasury. Elsewhere it is the Minister of Commerce, or the Minister of the Interior, the Comptroller of the Currency, all of them officers of State who have no direct interest in the handling of funds, who superintend the savings banks. There is no possibility there of a clashing of interests. The point is not one purely of form.

"Whose bread I eat, his service I do;" so says a German proverb. *Cujus regio, ejus religio.* Our arrangement makes, as Mr. Meikle has pointed out in the evidence given before the Parliamentary Committee of 1888, the Chancellor of the Exchequer "at once "buyer and seller of our funds," which, so our witness adds, "is scarcely fair." His cancellarian shirt is apt to assert itself as clinging more closely to his skin than his savings banks coat. The interests of the savings banks are, in other words, apt to be subordinated to those of the Exchequer, as indeed they have been not once or twice only. The arrangement in fact directly violates one of the cardinal rules laid down in all our savings banks legislation, that is, that no person acting as trustee of savings banks funds should have any personal or official interest in their administration or profits. The unquestionably urgent consideration of security for the depositors' funds in the initial stage of their being handed in, which Mr. Gladstone rightly, of course, put forward, has very naturally pushed into the background for the time the even more weighty consideration, which more particularly occupied the very competent Parliamentary Committee of 1858, with regard to the subsequent custody and administration of the funds. That committee was not by any means adverse to State guardianship, but it insisted that the administrators, whoever they might be, should have only *one* interest to safeguard, *the interest of the depositors*, that they should be "Trustees." It is the duality of interest at present prevailing, the Chancellor of the Exchequer, who has to provide cheap money for the nation, and to save the country from the burthen of excessive balances, being also guardian of the depositors, whose interest it is to have much money laid by and make the most of it, which has brought us to our *impasse*. We have the confession of a Chancellor of the Exchequer himself to this effect, in his own words. "The more business the Post "Office transacts," so said Mr. Goschen ten years ago, "the better "satisfied are the officials; they are very ambitious to extend its "transactions." Rightly so, I should say, and the more they do this, the greater praise do they deserve from the public. "But as "Chancellor of the Exchequer I am adverse to any measure "which would largely increase the already gigantic amount stand-"ing to the credit of depositors." Here we have a conflict of interests, the subordination of fiduciary duty to departmental frankly owned to. Now picture to yourselves an administrative board constituted like what the French *Caisse des Dépôts et Consignations* was intended to be, a strictly unselfish, disinterested, and careful body of trustees, acting with a single mind for the saving depositors, using their judgment to the best of their power to turn the accumulated money to the best possible account, con-

sistently with absolute safety, and being allowed ample means of doing so, and this conflict of interests, this duality of object, the making the savings banks the Cinderella of the Treasury, at once ceases. The Post Office will receive praise instead of blame for doing its duty, and will be stimulated into doing some more by the knowledge that it is not working purely for another. Our first demand, if we really want saving to be further encouraged, should, I think, be to the effect that the present unnatural union be brought to an end, and someone be set to watch the milk who has no interest in lapping it up.

The second point really arises out of the first. We compel savings banks to put all their funds into consols. The legislation of 1891 and 1893 has further strengthened this obligation, straining it to the point that at Glasgow the bond has actually snapped. Now, as observed, when we first invited, and afterwards compelled, savings banks to invest in consols, we had plenty of consols and little money, and consols were reckoned practically the only trustworthy security. Now, we have a national debt of 652,540,105*l.*, of which 589,146,878*l.* is in consols, and we pay it off at the rate of about 8,000,000*l.* a year. We have savings banks holdings of about 168,000,000*l.*, increasing at the rate of about 11,000,000*l.* a year. Subdivide distances as you will, if this twofold rate of progress continues, and you insist upon keeping both moving bodies on the same track, within a measurable distance of time the point *must* be reached at which Achilles will overtake the tortoise; in other words, go on raising the price of consols against yourselves as you will, up to 200*l.*, or 300*l.*, or 500*l.*, if savings moneys *must* go into consols, at some time or other your stock of consols will be exhausted. And what then? Your proposal appears to be, to wait till that deadlock has actually been reached. Will you then adopt Southey's recommendation and create a new national debt, merely for the sake of providing a convenient investment? There is no occasion for doing this. There are investments now in plenty which did not exist in 1817 and 1828, and which are safer than consols were then. There are municipal securities, there are colonial securities, there are river board, harbour board securities, and a multitude besides, as fully guaranteed, with the danger of depreciation owing to political complications removed.

It is at any rate possible that the proper escape from our dilemma may lie in the direction in which other nations have very effectually found safety, that is, in greater freedom in the employment of funds. There are custodians available in plenty of whom it cannot be *à priori* assumed that God Almighty did not give them as good and dependable heads to think and judge with as He gave

to the National Debt Commissioners. In 1869, so Mr. Meikle deposed in the Parliamentary Inquiry of 1888 and 1889, Sir A. Spearman, no mean judge in the matter, himself Comptroller in those days, specifically suggested that trustee bank trustees should avail themselves of the greater facility of judging of the value of securities which they possess, being on the spot, and "recommended us under the power we possess to invest "in safe local securities." He said: "The trustees are well able "to judge." Sir Alexander's successors now argue altogether the other way. We hear that in 1891 colonial securities were ruled out of court because some of them are doubtful, and the National Debt Commissioners, laying down hard and fast rules once for all, could not discriminate. But a body of trustees may. The same thing applies to municipal securities; and in addition many loans to municipalities and rate levying corporations have been disallowed, though they represent absolutely the *safest* security existing, an *ideal* one for savings banks, since they repay the exact amount which they first take up. There is the Trust Investment Act of 1889. Why should not that apply to savings banks? Do Chancellors of the Exchequer, who deprecate such application, really mean that the choice of securities made in that Act is an unsafe one, misleading to trustees? Then it constitutes a grievous wrong. However, such an explanation is absolutely inconceivable. But if the choice made be good, why should it not apply to the savings banks? I want, in passing, to point out how very much and how very directly this question of savings banks investments concerns town councils, county councils, and other corporate bodies who have occasion to borrow money, and for whose purposes savings banks have in the past been found particularly appropriate.

To sum up, we have ways open to us alternative to that of restricting saving, which at any rate deserve to be considered. We have part of our apparatus ready, which only requires to be partially remodelled to adapt it to the larger demands put upon it. We have our Posts Office Savings Banks doing admirable service. Nobody will want to do away with them. But you may make them even more useful by freeing them from embarrassing shackles and placing them under an authority which will not rate them, as Mr. Goschen has done, for being unduly "ambitious," when they simply try to do their duty. Our trustee banks have become the veritable step-child of official economists. But there is much useful work which they effectively do, which a Post Office Bank could never accomplish. A Post Office Bank is a brick building with a slot in it through which to receive pence. It has no mouth, no mind, no heart. It cannot give advice as trustee

banks do to much good purpose. It cannot go into the world to preach the gospel of thrift, bringing back converts to its counters. It does not observe secrecy as trustee banks do. It does not arouse local interest stimulating pride in its success, as do the distinctively local trustee banks of Glasgow, Liverpool, Manchester, Bradford, Hull, and others, and it is not nearly as economical. Its expenses amount to $6\frac{1}{2}d.$ per transaction and $9s.$ per cent. on the funds, as contrasted with $4d.$ per transaction and $3s.$ $8d.$ per cent. on the funds in the Trustee Bank of Glasgow, which holds about 7,250,000*l.* to about 170,000*l.* held by the local Post Office Banks. There are many trustee banks which one could see wound up with equanimity, even with satisfaction. Their day has gone by, they are no longer suited to the circumstances of the time. But it will be an ill day for this country when the banks which have become strong, localised institutions like Glasgow, Manchester, Moorfields, are compelled to close their doors. The striking success which these banks have attained, among our "canny" brethren of the north, the particularly powerful hold which they have acquired on the population of Scotland, ought, for one thing, to argue in their favour. But there are other grounds. They have more particularly given remarkably satisfactory proof of their competency in investing funds profitably and with safety—which is the very thing of all others wanted in our present dilemma. As the Chief Registrar of Friendly Societies has deposed before the last Committee of Inquiry, there has not, so far as can be ascertained, ever been a loss even upon their "special investments," that peculiar bugbear of Downing Street, but the desideratum of depositors. The present regulations cramp them and threaten finally to strangle them. Mr. Bartley has suggested that they should escape from the peril by reconstituting themselves as Joint Stock Companies. Joint Stock Companies unfortunately suggest profit, dividend, and, moreover, make control and inquiry difficult, if not illusory, whereas all savings banks managers are agreed that inquiry and control *cannot be too severe and too searching.* "Appelons "le contrôle" so frankly states M. Rostand, the most outspoken advocate of free savings banking abroad, "mais repous-"sons l'intrusion." There is more to be said for Mr. Bartley's alternative proposal, to convert the Trustee Banks into chartered corporations. It might be possible to reconstitute them to as great advantage under the Industrial and Provident Societies Act, which under its banking clauses gives almost absolute liberty. I have been asked if municipalities, for instance the London County Council, could form municipal savings banks such as the large municipal savings banks abroad, which render admirable ser-

vice. The law seems adverse to this. But county and town councils might do much to support trustee banks and encourage ancillary institutions such as penny banks, school banks and collecting banks. And they could do very much to stimulate action of a third kind for which the time certainly seems come.

In 1887, speaking in Parliament on the same subject, Sir J. Lubbock called attention to what he called the "Workmen's "Banks" of the Continent, those co-operative "People's Banks," which have shown themselves not only so remarkably safe that in Prussia law courts allow trust moneys to be deposited with them, but also serviceable in the application of the moneys collected to fructifying uses beyond anything which might have been expected. If there is an educational principle in savings banks, as I maintain that there should be, if State action and patronage in this matter are intended, as they should be, only to act as "the "schoolmaster" to train the poor for better things, here are the institutions to which savings banks should lead up—self-help savings banks, in which the savers collect and administer their own savings, for their own profit, and under their own responsibility. Vicarious providence is, after all, only a half virtue. The State, so we are generally agreed, ought to do for men only what men cannot do for themselves. Make the men provident themselves and for themselves, and you will not need to be provident for them.

In time past it might be argued that our working men and generally the people who deposit their money in savings banks, were not ripe for such independent, self-governing action. In view of the signal success of our great co-operative associations, our trade unions, our friendly societies, this can no longer be maintained. The men can very well look after their own interests. There is room enough for such banks by the side of our Post Office Banks, Trustee Banks, School Banks, and all the preliminary and ancillary services. If you will let them work freely side by side, you may relieve the Treasury of its embarrassment without stopping the fruitful current of savings, and render richly serviceable for fructifying uses colossal and gigantic stores of money which now are unprofitably "stockinged" in Consols, unproductive and almost running to waste like the Scriptural "pound" wrapped up in a napkin. I have shown you what freedom in this matter accomplishes abroad, not only among continentals but among our own cousins beyond seas. I leave it to you to judge whether in some way or other we may not apply the same elastic method, at any rate, to some extent and in some qualified form, to our own case. We cannot, as a nation, do without thrift. And

for thrift, as Mr. Gladstone has pointed out, self-help is by far the best agent. There is still, and there always will be, scope for State action in the matter. Our economic babes must in the first stages be suckled with milk. But do not let us carry our suckling process beyond its proper bounds. We see to what serious extent it embarrasses us. "It is self-help," so Mr. Gladstone has written, "which makes the man; and man-making is "the aim which the Almighty has everywhere impressed upon "creation. It is thrift by which self-help for the masses, "dependent upon labour, is principally made effective. In them "thrift is the symbol and the instrument of independence and "liberty, indispensable conditions of permanent good." Do not let us unduly narrow to them for the sake of mere departmental convenience, or the exclusive interest of a small class of rich men, the power of obtaining that "good." The chief sufferer by such course would be the nation.

APPENDIX.

TABLE I.—*The following Comparative Statement of the Transactions of Post Office Savings Banks only in Various Countries is given in the last French Official Report, showing the Accounts on 31st December*, 1895.

[The figures do not in every instance agree with those which I have received from the countries in question.]

Country.	Number of Deposits.	Balance of Deposits in Francs.	Mean Value of each Account in Francs.	Depositors to 1,000 Population.	Deposits to 1,000 Population, in Francs.
Austria—					
Savings department	1,110,091	110,620,780	99·65	46·00	4,583·90
Banking department	28,363	136,354,820	4,807·49	1·00	5,556·90
Belgium	882,370	318,466,372	360·92	137·64	49,676·67
Canada	125,353	146,263,918	1,166·81	25·00	29,253·00
France (Algiers and Tunis)	2,488,075	753,458,527	302·82	64·55	19,548·41
Hungary—					
Savings department	276,565	27,145,492	98·15	16·00	1,444·00
Banking department	3,767	18,170,542	4,823·61	?	940·00
Italy	2,896,768	448,622,323	154·86	102·00	15,763·46
Netherlands	499,963	92,788,254	185·60	104·03	19,348·43
United Kingdom	6,453,597	2,446,724,375	379·12	164·00	62,275·00
Sweden	408,288	53,483,725	130·99	83·00	10,872·58

TABLE II.—*Depositors in Savings Banks in Different Countries in* 1894.

[Copied from the official "Statistical Abstract" of the United States.]

	Depositors.	Amount of Deposits in Savings Banks.	Average Amount per Depositor.
	No.	£	£ *s.* *d.*
United Kingdom	7,579,709	132,740,470	17 10 3
Sweden	1,111,187	17,480,753	15 14 7
Norway	523,918	12,069,320	23 – 9
Holland	776,718	8,668,500	11 3 3
Austria-Hungary	4,625,183	170,618,111	36 17 9
Belgium	1,053,699	17,092,683	16 4 5
Italy	4,593,210	79,081,017	17 4 4
France	8,608,275	156,752,520	18 4 2
Denmark	943,594	30,002,301	31 15 11
United States	4,875,519	377,207,713	77 7 4
Canada	240,195	11,995,621	49 18 10
Australasia	894,879	26,097,176	29 3 3
	35,826,086	1,039,606,685	29 0 0

Note.—The returns used for the comparison are not of strictly corresponding dates. The figure quoted for the United Kingdom leaves out of account the "Stock Investments," which are undoubtedly savings.

TABLE III.—*The following Tables, showing the Position of Saving Banks in different Colonies, are taken from Mr. T. A. Coghlan's "The Seven Colonies of Australasia, 1895-96," published by Mr. Charles Potter in Sydney.*

Year.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	New Zealand.	Australasia.
				Number of Depositors.				
1871	24,379	45,819	6,769	14,270	1,062	8,500	14,275	115,074
'81	72,384	101,829	20,168	37,742	3,219	14,728	61,054	311,124
'91	158,426	300,781	46,259	78,795	3,564	26,916	126,886	741,627
'95	202,802	338,480	56,421	86,734	16,160	30,769	103,513	894,879
				Amount of Deposits.				
	£	£	£	£	£	£	£	£
1871	945,915	1,117,761	407,134	517,000	15,583	217,413	454,966	3,675,772
'81	2,698,703	2,569,438	944,251	1,288,450	23,344	369,278	1,549,515	9,442,979
'91	5,342,135	5,715,687	1,660,753	2,217,419	46,181	554,417	3,406,949	18,943,541
'95	8,073,575	7,316,129	2,286,810	2,691,273	460,610	648,083	4,620,696	20,097,176
				Average Amount per Depositor.				
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1871	38 16 –	24 7 11	60 2 11	36 4 7	14 13 6	25 11 7	31 17 5	31 18 10
'81	37 5 8	25 4 7	46 16 5	34 2 9	7 5 –	25 1 6	25 7 7	30 7 –
'91	33 14 5	19 – 1	35 18 –	28 2 10	12 19 2	20 12 –	26 17 –	25 10 1
'95	39 16 2	21 12 4	40 10 7	31 – 7	28 10 1	21 1 3	28 5 2	29 3 3
				Average Amount of Deposits per Head of Population.				
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1895	6 6 4	6 3 10	4 19 4	7 10 7	4 11 –	4 – 7	6 12 3	6 3 2
				Depositors per 100 of Population.				
1895	16	29	12	24	16	19	23	21

TABLE III—*Contd. Post Office Savings Banks and other Savings Banks Compared*, 1895.

	Number of Depositors in			Amount of Deposits in			Average Amount of Deposits.		
	Post Office Savings Banks.	Other Savings Banks.	Total.	Post Office Savings Banks.	Other Savings Banks.	Total.			
				£	£	£	£	*s.*	*d.*
New South Wales	131,703	71,099	202,802	4,121,700	3,951,875	8,073,575	39	16	2
Victoria	125,883	212,597	338,480	3,128,128	4,188,001	7,316,129	21	12	4
Queensland	56,421	—	56,421	2,286,810	—	2,286,810	40	10	7
South Australia	—	86,734	86,734	—	2,691,273	2,691,273	31	–	7
Western ,,	16,160	—	16,160	460,610	—	460,610	28	10	1
Tasmania	6,785	23,984	30,769	114,994	533,089	648,083	21	1	3
New Zealand	137,683	25,830	163,513	3,895,543	725,153	4,620,696	28	5	2
Australasia	474,635	420,244	894,879	14,007,785	12,089,391	26,097,176	29	3	3

Appendix *to* Mr. H. W. Wolff's Paper.

A Review of the Savings Banks Systems of Different Countries.

Foreign Countries.

France.

France has both Post Office savings banks and independent, or semi-independent, "ordinary" savings banks. The latter, receiving by far the larger portion of the deposits, numbered at the close of 1896 545, with 1,517 branches and receiving offices in addition. Of 544 such banks existing in 1895, 457 were under the direction of municipal councils, 57 were independent institutions, 29 were something between the two (semi-autonomous), and 1 (at Nancy) formed an annexe to the local *Mont de Piété*, providing it with money and employing its funds in its business. In banks of the first description the municipal corporation approves the rules, nominates the directors, and guarantees the funds. The mayor is *ex-officio* chairman. The "independent" savings banks are organised as corporations. Directors are appointed by co-optation (election by subscribers having proved a failure). The bankers before opening business are required to show a capital sufficient to serve as guarantee fund. Some of the municipal and independent savings banks are very large. Thus Paris holds more than 6,000,000*l.* in deposits, Lyons and Marseilles hold close upon 3,000,000*l.* each. In respect of supervision the ordinary savings banks are subordinated to a special department of the Ministry of Commerce, not to the Treasury. Up to 6th August, 1895, they were required to hand over all their receipts for investment to the *Caisse des Dépôts et Consignations*, which is a Government Board, altogether distinct from the Treasury, acting as official trustee. Since the date named they are allowed, with the consent of the Minister of Commerce, to retain part for independent investment. The *Caisse* allows the banks a uniform interest, standing now at $3\frac{1}{4}$ per cent. Out of that the banks are required to defray their expenses and lay up a reserve fund. The balance is available at their discretion for payment of interest, which now stands generally at 3 per cent. (as compared with $2\frac{3}{4}$ per cent. in the Post Office banks). Their own share capital and the reserve fund the "ordinary" savings banks are now allowed to invest at their pleasure in local (departmental and communal) securities, debentures of chambers of commerce and of the *Crédit Foncier*, and in buildings for their own use. In addition they are permitted, subject to the approval of the Minister of Commerce, to employ all their profits and one-fifth of their deposit capital in their own locality, investing it in bonds of *Monts de Piété* and other institutions recognised by law as of public utility, in the building or purchase of working men's dwellings, in mortgage loans to building societies or bonds issued

by such societies, and in advances to co-operative banking societies. Moreover, provided that their own share capital reaches the proportion of 2 per cent. of their deposits, they are at liberty to apply one-fifth of their profits in payment of additional interest to depositors whose deposits have not exceeded 500 frs. in the year. Up to 6th August, 1895, the *Caisse des Dépôts et Consignations* was obliged to invest all savings banks funds in public securities. Under the new law it may invest part of them in paid-up and saleable bonds (*obligations négociables et libérées*) of departments, of communes, of chambers of commerce, and of the *Crédit Foncier*, having previously (since 1894) been permitted to lay out one-fifth of the reserve fund, which it is required to set apart, in improved working men's dwellings. Concurrently with these concessions the maximum limit fixed for deposits in savings banks of *all* descriptions has been lowered to 1,500 frs. That limit has in the past varied exceedingly. In 1851 it was fixed at 1,000 frs. Since then it has gone up to 2,000 frs., to 3,000 frs., and down again to 2,000 frs. and 1,500 frs. The minimum limit is 50 c. Deposits exceeding 1,500 frs. are relieved, if not reduced by the depositors, by "automatic" purchase of *rentes*. (Five years are allowed for the reduction of old accounts.) Post Office banks likewise pay over their funds to the *Caisse des Dépôts et Consignations*, observe the same limits, receive the same interest, but allow their depositors only $2\frac{3}{4}$ per cent.

The last official report shows that at the close of 1895 there were 7,391 Post Office savings banks, holding among them 753,458,527·90 frs. of deposits in 2,488,075 accounts. The average value of each account was 302·82 frs. The entire assets of the Department stood at 759,326,233·13 frs. The year's transactions show a net increase of 62,614,067·52 frs. The reserve fund (*compte de dotation*) stood at 5,867,705·23 frs. The management expenses are put at 3,429,094·07 frs., the cost of each transaction at 83 c., the cost of management, calculated proportionately to business, at 45 c. per 100 frs. deposits. At the same date the ordinary savings banks held in deposit balances 3,395,460,185·15 frs. in 6,498,556 accounts, which raises the total number of accounts to 8,986,631, at the rate of about 23 per 100 population, and the deposits to 4,148,918,713·05 frs., or about 461·67 frs. per depositor and 109 frs. per inhabitant. In the ordinary savings banks alone the average value of each account in 1895 stood at 522·50 frs.; there were 170 depositors to 1,000 population and 88·55 frs. deposited per inhabitant.

The effect of the lowering of the maximum limit under the law of 1895 is shown to have been very striking. The reduction took effect on 6th August, 1895. In the Post Office banks there was a trifling increase in the purchase of *rentes* to depositors, viz., 6,906,627·05 frs., to which must be added 604,717·85 frs. "automatic" purchases, making 7,511,344·90 frs. in all, as compared with 6,158,868·50 frs. in 1894 (but in 1893 the figure stood at 7,450,348·85 frs.). But the proportion of withdrawals to new deposits, which before 1893 (the year of the scare) had stood at 73 and 75 per cent., rose to 89·3 per cent. Whereas in the five

months August to December, 1896 (in the Post Office banks alone), deposits had exceeded withdrawals by 20,149,686·29 frs.; in the corresponding period of 1895 withdrawals exceeded deposits by 7,617,641·39 frs. In the place of 42 in 1890, and 50 in 1892, 58 depositors to every 100 new deposits withdrew their accounts. In "ordinary" savings banks the results are very clearly visible in the transactions of 1896. In 1895 the deposits held on balance still went up from 3,286.521,927·65 frs. to 3,395,460,115·15 frs., the average value of each account rising proportionately from 519·28 frs. to 522·50 frs. But in 1896 it is estimated that deposits have gone down to 3,370,789,959·08 frs., and the average value of each account to 508·67 frs., giving, indeed, 173 depositors to 1,000 population, but only 87·91 frs. deposited per inhabitant. The falling off in new deposits is stated to be by 142,125,500·47 frs. (5,600,000*l.*), viz., the difference between 839,595,251·94 frs. and 697,469,751·47 frs.

Belgium.

Belgium has a few old "free" savings banks, and its co-operative *Banques Populaires* collect a considerable amount in deposits. But the main business of collecting savings is in the hands of the *Caisse Générale d'Épargne et de Retraite*, which is a public institution, guaranteed by the State, but administered by a distinct staff appointed by the government. For the collection of savings it makes use of the various Post Offices, as also of the branch offices of the *Banque Nationale*, and of some other public offices. It enjoys some special privileges, among them that of acting as banker to some public departments, which draw an interest at the rate of $1\frac{1}{2}$ per cent. on their cash balances. At the close of 1895 there was 11,912,861 frs. standing to the credit of such departments. The *Caisse* takes deposits from 1 fr. upwards, paying interest at the rate of 3 per cent. There is not really a maximum limit, but as soon as the deposit standing to the credit of any one depositor exceeds 3,000 frs., since 1894 the interest allowed *on the whole sum* is reduced to 2 per cent., and the *Caisse* has the right to invest the overplus (above 3,000 frs.) in *rentes*. By this means the average interest on deposits, which in 1891 worked out at 2·87 per cent., was reduced in 1895 to 2·72 per cent. The *Caisse* also purchases *rentes* for the order of depositors, charging a small fee on each transaction. Under the effect of the reduction of interest on balances of more than 3,000 frs., the purchases of *rentes* through the *Caisse* have slightly increased, growing to 31,683,200 frs. in the year 1895. The amount of *rentes* administered by the *Caisse* was at the close of 1895 114,071,100 frs., standing in 24,507 names. The *Caisse* enjoys absolute discretion in respect of its investments. It invests rather largely, and advisedly, in commercial acceptances, native and foreign. Such outlay yields a rather smaller return than investment in funds or on mortgage; more particularly does this apply to the discounting of foreign bills (only 1·32 per cent. as compared with 3·15 per cent. on Belgian), but it gives the *Caisse* readily realisable assets. At the close of 1895, out of a total of 470,762,987·92 frs. invested, the *Caisse* held 36,690,718·81 frs. in

Belgian and 67,515,138·66 frs. in foreign bills, 104,205,857·97 frs. in all. There was 27,542,500 frs. lent out in advances on securities at the rate of 3½ per cent. There was 158,706,091·56 frs. invested in public securities and 23,316,004·89 frs. in securities guaranteed by the State; moreover, 54,153,616·63 frs. in provincial and municipal stock, 80,390,721·41 frs. in debentures of Belgian companies, 4,688,800·73 frs. in mortgages, 11,116,976·73 frs. in advances to building societies, 2,000 frs. in advances to agricultural credit societies, 2,515,991 frs. in loans to farmers. The *Caisse* makes a point of assisting building societies and agricultural credit societies with loans. Out of the annual profits accruing the *Caisse* is under obligation to lay up a double reserve fund. At the close of 1895 that fund stood at 10,336,117 frs. It is furthermore required to distribute every fifth year the overplus of the profits over such reserve fund as it may appear necessary to retain, among depositors of at least one year's standing. The amount thus distributed in 1891 was 1,552,539 frs. The management expenses were in 1895 900,586·24 frs. The profit for the year is returned as 437,444·14 frs. The number of transactions in 1895 was 2,222,820, to the amount of 206,880,203·02 frs. The balances due to depositors at the close of 1895 were 453,429,304·26 frs., held by 1,145,408 depositors, 439,842,406·41 frs. standing for deposits of individuals, 13,586,897·85 frs. for deposits held by corporate bodies. The mean value of each account was 396 frs., having gone down to that figure from 406 frs. in consequence of the lowering of interest on deposits above 3,000 frs. The proportion of depositors to population was 17,963 to 100,000.

The Netherlands.

The main savings bank business in the Netherlands is done by the private savings banks, numbering in 1894 282. These banks are absolutely unfettered by any law. They are limited liability companies raising a guarantee capital by shares, and as a rule limiting their dividend to a very low figure, in the savings bank of Amsterdam to 2·475 per cent. They each fix their own minimum limit, 1 fl., 25 c., 10 c., even ½ c. Only a few have adopted a maximum limit, 1,000, 1,500, and 3,000 fls. They each also fix their own rate of interest, which varies from about 2½ to 5 per cent. Not a few have graduated scales of interest. The private savings banks invest their funds at their own pleasure. Their collective holdings were at the close of 1894 70,027,000 fls. (about 5,600,000*l.*), in addition to 10,312,000 fls. reserve funds. There were 338,978 depositors, holding on an average 207 fls. each, which is 14·60 fls. per inhabitant, there being 7 depositors to every 100 population.

The Post Office savings bank exists since 1881. Its business is still only about half that of the private savings banks (37,656,647 fls. in 1894), but the number of its depositors is greater (401,046 in 1894), and the business is increasing rapidly. By the close of 1895 the number of accounts had risen to 448,581, and the amount of holdings to 44,184,883 fls. The Post Office savings bank takes deposits from 25 c., allowing 2·64 per cent. interest on the full

florin, but nothing beyond 800 fls. The funds of the Post Office savings bank are administered as a distinct fund, and are invested at the discretion of the department in public and private securities, in advances on security or otherwise. Public securities earned in 1895 only 2·86 per cent. interest, but other investments raised the average to 2·93 per cent. (3 in 1894, 3·82 in 1884). Since 1891 the Post Office bank lays up a reserve fund, which at the end of 1895 stood at 34,345 fls. The average holding per depositor in 1894 was 84 fls., which is equal to 7·85 fls. per inhabitant. There were 294 depositors per 1,000 population.

Taking the two classes of banks together, there were at the close of 1894 740,024 depositors, holding 107,684,000 fls., at the rate of 22·45 fls. per inhabitant, and 164 depositors per 1,000 population.

In addition to the two types of savings banks described, there are in Holland some fifteen or sixteen *Spaarkassen*, which are provident sharing out societies, paying about 1,000 fls. a year in management expenses, and voting about 2,000 fls. a year to charitable purposes.

Germany.

In Germany the administration of savings banks is governed by the legislation of each separate State. The system in force is, however, practically uniform. There are no Post Office savings banks. The savings banks are as a rule maintained by some local community, the "circle," the province, the town, or the rural parish, and directed by officers appointed by the administrative authorities. The district authorities, being all of them rate-levying bodies, are answerable to depositors. The system adopted thus provides absolute security. There are also independent banks, answering in respect of status severally to what corporations, or trustee banks, or joint stock companies would be in the United Kingdom. They enjoy entire freedom of action. Some of the savings banks are very large. In addition there are a considerable number of co-operative people's banks—*Creditvereine* and *Darlehnskassen*—acting very effectively as savings banks, and collecting large sums of money. Prussia possessed at the end of 1893 in all 1,471 savings banks. Of that number 615 were municipal, 170 maintained by rural parishes, 365 by "circles," 6 by provinces, and 215 were private savings banks. The addition of 517 branch offices and 1,821 receiving offices, raises the total of collecting agencies to 3,809, viz., 903 communal, 192 parish, 2,001 district and "circle," 176 provincial, and 527 private or association banks. This gives a collecting office to every 8,129 inhabitants. Minimum limits range from 0·05 mk. ($\frac{3}{8}d.$), in factory banks even 0·03 mk., to 20 mks. Maximum limits, where there are such, rise to 50,000 mks. (2,500*l.*). But they are not by any means general. There are 911 savings banks which have no limits. The rate of interest varies generally speaking from $1\frac{1}{2}$ per cent. to 9 or 12 per cent.; the general average is 5 to 6 per cent. The total amount standing to the credit of depositors at the close of 1893 was 3,750,251,523·22 mks. (at the close of 1894, 4,250,730,000 mks.) not counting co-operative banks.

In addition there was, at the close of 1893, 4,389,354·82 mks. laid up in a fund corresponding to our "special investments," which savings banks adopting a maximum limit are required to maintain as an overflow receptacle for savings. The reserve funds accumulated in the savings banks, as required by law, stood, at the close of 1893, at 265,008,034·55 mks. Beyond that 11,212,000·42 mks. was, in 1893, voted out of savings banks profits for charitable and otherwise useful purposes, bringing up the total of money so employed since the creation of the banks to 152,437,735·38 mks. The gross profits earned in the year are returned as 36,469,268·49 mks.

With regard to employment of their funds the savings banks enjoy absolute freedom, subject to approval of their "plan" of investment, allotting a maximum of so many per cent. under each head, every year by the Ministry of the Interior. At the close of 1893 the savings banks moneys held were invested as follows:—2,215,111,717·87 mks. (56·20 per cent. of the whole) in mortgages; 1,157,918,996 mks. (valued at 1,138,028,196·26 mks. = 28·93 per cent.) in public securities; 158,565,716·64 mks. (4·03 per cent.) in promissory notes; 58,058,031·57 mks. (1·48 per cent.) in bills of exchange; 57,469,724·89 mks. (1·46 per cent.) in advances upon security; 296,804,142·49 mks. (7·8 per cent.) in loans to public bodies, giving a total invested of 3,934,183,592·72 mks., and leaving 59,555,710·47 mks. cash in hand.

Bavaria had at the close of 1894 about 400 savings banks, most of them (325) being "communal." There are no statistics available as to the business of the private savings banks. The 325 communal savings banks had 665,943 depositors on their books with 230,555,428 mks. standing to their credit, representing an average balance per depositor of 346 mks., and 40·2 mks. per inhabitant, and 11 depositors to 100 of the population. The interest allowed varied from 1 to 4 per cent., the mean rate being 3·3 per cent. The funds were shown to be invested as follows:—132,869,384 mks. (54·1 per cent.) in mortgages; 17,037,620 mks. (6·9 per cent.) in Bavarian public securities; 37,230,231 mks. (15·1 per cent.) in securities issued by corporations; 44,772,011 mks. (18·2 per cent.) in debentures of Bavarian credit institutions and other joint stock companies and associations; and 13,889,684 mks. (5·7 per cent.) in other ways.

The Grand Duchy of Baden had in 1890 123 public (communal and district) savings banks, holding among them 259,000,000 mks. in 292,114 accounts. Hesse had in 1894 43 public savings banks, in addition to 343 local loan and deposit institutions.

Denmark.

The savings bank system in force in Denmark combines freedom in administration with rigorous control by the government. The government does not interfere in the least in the management, nor are there any rules laid down by law with respect to employment of the funds. But the banks are required annually to send in full balance sheets to the Minister of the Interior, who may, on the ground of those documents, proceed with an inquiry. Should a deficiency be shown in its assets amounting

to 5 per cent. of the deposits, the bank in question may at once be wound up. There were in 1895 540 savings banks, holding among them 595,513,915 kr. (about 30,861,884*l.*) in 999,854 accounts. The old savings bank of Copenhagen, established in 1820, alone held on 31st March, 1896, 111,857,261 kr. in 107,468 accounts. (The krone is approximately equivalent to 1*s.* 1⅓*d.*) The reserve fund of this bank stood at the time at just 8,000,000 kr. At the close of 1895 the collective holdings of the 540 banks showed an increase on 1894 of 36,068,173 kr. There were in addition reserve funds amounting collectively to 27,826,077 kr., and the balance sheets showed a profit on the year of 4,040,604 kr. The interest allowed varies between 3 and 6 per cent., including some graduated scales, but is on an average 4 per cent. The investments of the savings banks include home and foreign securities, public and private, Russian, Swedish, Austrian, shares in joint stock companies, debentures of various societies and corporations. There were 14,435,863 kr. lent out to municipalities, 49,387,402 kr. on purely personal security, 257,457,739 kr. on mortgage.

Sweden.

Sweden is the only Scandinavian kingdom which has Post Office savings banks. They were introduced in 1883. The Post Office savings banks are administered by a board of five, of which the Postmaster-General is chairman. The Public Debt Office nominates one member. The minimum deposit allowed is 1 kr. (1*s.* 1⅓*d.*). By way of receipt, the banks issue stamps of the value of 1, 2, 5, 10, 20, 50, and 100 kr. Interest is allowed at the rate of 3·6 per cent., but not upon any excess above 2,000 kr. The funds are invested by the savings bank board in public securities, in loans issued by municipalities, or in corporation stock, or else in land mortgage bonds or similar securities. The interest netted is at present at the rate of 3·99 per cent. The management expenses of Post Office savings banks are said to be lower in Sweden than in any other country. At the close of 1894 the Post Office savings banks of Sweden held among them 29,681,630 kr. (about 1,500,000*l.*) in 367,337 accounts, showing a considerable increase on the year. By the end of 1895 the number of depositors had risen to 408,288, and their collective holdings to 53,483,725 frs.,[1] which allows an average holding of 131 frs. to each depositor, and 83 depositors and 10,873 frs. to every 1,000 inhabitants.

The private savings banks enjoy absolute freedom of administration, but are subject to government inspection, and may be closed if their balance sheet should show a deficiency of assets as against liabilities of 5 per cent. The savings bank of Stockholm, which holds about 2,500,000*l.* in deposits, takes no deposits under 3*d.*, and fixes the rate of interest according to the business of the year. Most of its money is invested in mortgages and debentures. Its holding in government securities is small. In 1894 the number of private savings banks in Sweden was 374. Among

[1] The figures given in francs are taken from the last *Report of the French Ministry of Commerce.*

them they held 324,482,984 kr. (about 18,000,000*l.*) of deposits in about 1,000,000 accounts, having in addition share capital and reserve funds of 27,000,000 kr. (1,400,000*l.*). The total amount of deposits in both kinds of banks was, accordingly, at the close of 1894, 354,164,414 kr. (about 19,600,000*l.*), among a population of 4,873,183.

Norway.

In Norway, under the law of 6th July, 1887, any body of men desirous of setting up a savings bank must first obtain government sanction. But, that sanction obtained, they are free to manage their bank as they please, only reporting regularly and submitting to government inspection, with the proviso that a deficit of 5 per cent. shown in the assets as compared with the liabilities entitles the government to close the doors of the bank. New banks forming are required to provide a capital of guarantee of at least 2,000 kr. (something above 100*l.*), which may be repaid out of profit. No dividends are permitted; the entire surplus must be carried to reserve; and when the reserve fund attains the figures of 10 per cent. of the deposits, any excess may be devoted to charitable purposes, provided that 4 per cent. interest is first paid on deposits. As soon as the deposits in a savings bank reach 20,000 kr. (something over 1,000*l.*), the law requires that at least one-tenth of that sum shall be invested in easily realisable securities, such as state bonds, bank shares, and the like, and no more than three quarters of the entire funds may be invested otherwise than in mortgages. The savings bank of Kristiania allows interest from the day of lodgement to the day of withdrawal. The bulk of its funds are invested in bills of exchange (to the amount of more than 12,000,000 kr.) and in debentures of mortgage banks and *Monts de Piété* (12,500,000 kr.). Its holding in government securities does not exceed a few thousand kroner. At the close of 1894 it held 34,453,088·99 kr. in 35,152 accounts, showing an increase on the year of 2,248,563·64 kr. and 980 accounts.

Austria.

Austria has, since 1882, Post Office savings banks working side by side with the old municipal or private savings banks. By far the largest amount of business is still done by the latter, the "free" savings banks, which at the close of 1895 numbered 472. Of such banks are the Savings Bank of Vienna, founded in 1819, which holds about 20,000,000*l.* in deposits, and the savings banks of Gratz and of Prague, both founded in 1826, the latter of which held at the close of 1894 close upon 11,000,000*l.* in deposits. These savings banks enjoy absolute freedom with regard to regulations, employment of funds, administration, &c. They settle their own maximum and minimum limits, if they adopt any, their own rate of interest and their own regulations as to withdrawals. The rate of interest varies considerably; no average is given. It is generally declining, and this is said to account for the large number of withdrawals, which appears to show that money is

being carried to competing institutions, such as people's banks. In 1894 there were as many as 150 savings banks in which withdrawals exceeded new deposits (by 17,660,267 fl.). The savings banks funds are employed in every variety of ways. In the report for 1894 particulars are given in respect of 1,704,552,000 fl. laid out in the following manner: 1,021,010,000 fl. (59·90 per cent.) was invested in mortgages, 52,231,000 fl. (3·06 per cent.) in discounting bills of exchange, 49,343,000 fl. (2·89 per cent.) in advances on tangible security, 1,001,000 fl. (0·06 per cent.) in advances on personal security, 434,313,000 fl. (25·48 per cent.) in stocks and debentures of the most varied description, 32,573,000 fl. (1·91 per cent.) in real estate, 69,967,000 fl. (4·11 per cent.) in temporary investments, the balance in other ways. The Savings Bank of Bohemia, which is the second largest in Austria, has the power of issuing bonds of its own to the value of one half of its holding in mortgages. The interest netted on investments varies between 3 and 5 per cent. In 1894 more than half the money (57·23 per cent.) was laid out at 4 per cent., 16·10 per cent. at $3\frac{3}{4}$ per cent., 19·19 per cent. at $3\frac{1}{2}$ per cent. and $3\frac{3}{5}$ per cent. As regards organising bodies, of the 472 "free" savings banks, in 1894, 26, situated only in Styria and Galicia, were maintained by "districts," 380 by municipal corporations or parishes, and 66 by associations corresponding to our boards of trustees. The distribution of the banks over territories is very unequal. The general increase during 1894 in the balances of "free" savings banks was 16,918,199 fl. Of this amount 83·74 per cent. is shown to be due to the capitalisation of interest. The reserve funds of 472 "free" savings banks reporting amounted to 156,096,000 fl., that is 10·20 per cent. of the deposits held. The 1,530,713,348 fl. of deposits carried over to 1895 was made up of 2,786,448 accounts. Generally speaking there was in 1894 one "free" savings bank to 52,408 population, the proportion varying in different territories from one to 19,638 in Upper Austria to one to 680,241 in the Bukowina. There were 113 depositors to every 1,000 inhabitants. The average deposit stood at 549·34 fl. per depositor, and 53·64 fl. per inhabitant.

The Austrian Post Office savings banks have, within the fourteen years of their existence, developed very rapidly, and become exceedingly popular, partly because of the facilities which they give for depositing savings, but even more owing to their character of popularised business banks, opening drawing accounts, and enabling people to transmit small sums by cheque. The preamble of the law of 1882 explains that they are to be made "conformable to the requirements of business life."

There were in 1895 5,417 Post Offices open for the receipt of savings, in addition to the rural letter carriers, to whose zeal and diligence the Post Office attributes most of the increase in deposits made, more specifically, by *juvenile* depositors. In 1895 rural postmen collected no less than 73,366 deposits, amounting to 1,902,181*l.* The minimum deposit allowed is 50 kreuzer (1 franc); the maximum balance 1,000 fl. The post offices also take stamp cards, by means of which in 1895 768,079 deposits were made, to the value

of 384,039·50 fl. Balances exceeding 1,000 fl. are "automatically" reduced, unless money is withdrawn, by the purchase of 200 fl. of State bonds at a time. The amount of State bonds so purchased up to the close of 1895 was 20,913,080 fl., apart from those still held by the Post Office, as shown below (17,045,410 fl.)—the 20,913,080 fl. being handed over to the depositors. The interest allowed on deposits is 3 per cent. The funds are invested in public securities, or securities, railway shares, &c., guaranteed by the State, but to the account of the Post Office, which is credited with the profit. The turnover of the Post Office savings banks was in 1895 68,499,256·05 fl., representing 2,595,117 transactions. The reserve fund stood in the savings department alone, apart from the pension fund for officers, at 1,995,207·17 fl. The balances due to depositors at the close of 1895 were 44,248,312 fl. in cash, and 17,045,410 fl. (face value) in State bonds, 61,293,722 fl. in all, standing in 1,110,091 accounts. The year shows an increase of deposits to the amount of 4,701,146·08 fl. and 1,120,614·37 fl. interest accruing, which totals up to an increase in deposits of 5,821,760·45 fl. The profit netted on savings is given as 365,400·46 fl. The total profit earned by the Post Office savings banks is shown to have been 1,341,123·25 fl., which has gone to add to the reserve and pension fund, the balance being carried to the account of the Post Office.

The entire management expenses amounted in the year to 344,389 fl. The cost of each transaction is given as 7·4 kreuzers (not quite 2*d.*). There are now 46 depositors in Post Office savings banks to every 1,000 population, with an average deposit of 39·86 fl.

The banking department of the Austrian savings banks is answerable for a far larger number of transactions than the collecting department, viz., 13,740,172, representing a turnover of 2,970,170,049·42 fl. (in comparison with 2,595,117 transactions and 68,499,256·05 fl.). Its operations yielded a net profit of 975,722·79 fl. Under the laws of 1882 and 1887 the Austrian Post Office opens drawing accounts (with the right of refusing and closing such to undesirable persons) to anyone who pays into it a fixed deposit of 100 fl., not to be drawn out while the account is kept open, on which interest is allowed as on any larger balance, but only at the rate of 2 per cent., as compared with 3 per cent. in the savings department. Persons residing outside Austria may open an account, and frequently do so, to be able to make remittances into Austria. The Post Office renders to its depositors almost every service that a banker usually renders to his customers, holding deposits, cashing and discounting bills, buying effects—advancing money on securities. But its main business is to transmit sums of money, the cheques given in payment for which it can, by its interconnection of offices, "clear" easily and without expense. In 1895 964,000,000 fl. was transmitted in this way, without any money being moved. In the course of that year 3,628 accounts were opened in this department, raising the number of accounts carried over to 1896, after allowing for withdrawals, by 2,529 to 28,363. The transactions averaged 37,644 per day, and totalled up to 13,740,172 in the year, marking an increase of

1,500,000 on the previous year, and dealing with a total sum of 2,970,170,049·42 fl., of which sum 1,579,133,030·05 fl. was passed over the counter at Vienna. The Post Office clearing house alone, which is employed by 73·2 per cent. of the customers in this department, had 1,995,704 transactions to record, standing for 964,063,900·62 fl. At the close of 1895 this banking department held 54,541,928·34 fl. in deposits in 28,363 accounts, giving an average of 1,922·99 fl. to each. In addition it held a reserve fund of 2,779,243·22 fl. The department repays itself by the employment of the moneys deposited, which are not invested in public securities only, but also in railway debentures and mortgage bonds (*Pfandbriefe*), and by a levy of 2 kreuzers on every transaction, a stamp of 2 kreuzers ($\frac{1}{2}d.$) on each cheque issued, and a charge on entries on the debit side of the account amounting to $\frac{1}{4}$ per mille up to 3,000 fl., and $\frac{1}{8}$ per mille beyond. In halfpenny stamps on cheques it has taken 52,743·94 fl. The losses sustained in the year amount to only 46 fl.

Hungary.

In Hungary, in the absence for a long period of any real self-government in towns, the collection of savings in private banks has been in the main left to joint stock companies. "Our savings banks," so writes to me Dr. von Jekelfalussy, the head of the Statistical Office of Hungary, "are, properly speaking, nothing else than deposit banks organised on the basis of joint stock companies, which exercise all the banklike branches of business nearly to the same extent as real banks." They have full freedom to make their own regulations for their own rates of interest, limits, methods of employment of funds. At the close of 1894 Hungary proper possessed, apart from Post Office banks, 546 savings banks; to these must be added 2 in Fiume, and 47 in Croatia, giving a total of 595. Most of these banks have a share capital of their own, which in 1894 568 returned at 12,169,700 fl., on which they had earned 14·1 per cent. profit per annum. At the close of 1894 595 savings banks returned their share capital at 101,956,200 fl., on which they had netted 13,469,600 fl. profit, equal to 13·2 per cent. The largest of these banks is that of Budapest, established in 1840, which had in 1895 a share capital of 5,000,000 fl., and held nearly 100,000,000 fl. in deposits. These banks allow from 3 to 6 per cent. interest, generally speaking 4 or 5. In respect of employment they use their liberty freely. At the close of 1893 the 568 referred to held no less than 233,321,900 fl. in bills of exchange, 235,835,600 fl. in mortgages, 17,362,300 fl. in promissory notes and notes of hand, and 88,351,300 fl. in public and private securities. The aggregate holding in deposits by private savings banks at the close of 1894 was 547,253,000 fl. The interest charged by these banks on discounts ranges from 3 to 16 per cent., for mortgages from 4 to 16 per cent., for advances on security from 4 to 15 per cent., for notes of hand and promissory notes from 3 to 12 per cent.; but the higher figures are in every instance exceptional.

The arrangements in force in Hungary with regard to Post

Office savings banks correspond entirely to those in use in Austria with respect both to the savings and to the banking department. At the close of 1895 the Hungarian Post Office savings banks held in savings deposits 10,858,194 fl., and in banking deposits 7,268,218 fl., in all, therefore, 18,126,412 fl. Their collective reserve fund stood at 302,502 fl. The year's profit amounted to 216.294 fl. There were about 4,000 Post Offices receiving deposits. Nearly all the funds were invested in public securities, but some were loaned to the Post Office and other public bodies, and 1,805,014 fl. was loaned out on securities. The deposits were held in 276,565 accounts.

Switzerland.

Switzerland is particularly strong in savings banks. Out of every 10,000 inhabitants 3,957 are depositors. There are at present 557 institutions in the country collecting savings. Of these, however, only 161 are savings banks proper, 168 being ordinary credit institutions, 50 close savings associations, 28 factory savings banks, and 150 school savings banks. The savings banks are governed, not by federal, but by cantonal legislation, which up to 1887 left them absolutely free to do what they chose. Since 1887 a few cantons have introduced some sort of government supervision. Aargau inspects and St. Gall allows no new savings banks to be opened without government sanction, and insists that each bank shall lay by a reserve fund, of which the maximum limit must be at least 10 per cent. of the deposits. Of the total of savings banks stated 4 per cent. are guaranteed by their cantons, 8 per cent. by local bodies, 27 per cent. are joint stock companies, 50 per cent. provident or co-operative societies, and 11 per cent. are private venture banks. Limits (where there are any) and rates of interest vary considerably. In respect of employment of funds there is entire freedom. As a matter of fact, 56½ per cent. of savings banks money is invested in mortgages, 23 per cent. in loans on security, 6 per cent. in railway and State debentures, ½ per cent. in shares of joint stock corporations, 1 per cent. in real estate, 2·13 per cent. is held in cash balances. A strong reserve fund is a common feature in all Swiss savings banks. Among a population of 3,023,382, Switzerland had at the close of 1895, 1,196,540 depositors, with 893,961,464 frs. of deposits standing to their credit, that is, 29,568 frs. per 100 inhabitants, and 755·5 frs. per deposit.

Italy.

Italy possesses two kinds of savings banks, in addition to the ordinary business banks and the co-operative *banche popolari* and *casse rurali*, all of which take deposits of small amount. The *Casse ordinarie di risparmio*, as an institution, are of considerable antiquity—and some of them are of great economic importance. The savings bank of Milan holds about 20,000,000*l.* of deposits, the savings banks of Rome, 3,200,000*l.* The larger of these savings banks are rather corporations than associations or companies, having either no capital or a very trifling one, and being

administered by a council and directors. In Milan, Bologna, and some other places it is considered a distinction to be elected to serve on the council. These savings banks enjoy, within certain limits, absolute self-government. They are free to pay what interest they like, and to invest their funds as they think best. They are, however, required to present annual returns to the Ministry of Agriculture and Commerce, and to submit to stringent inspection by its officers. Should such inspection show the bank to be improperly managed, or its own capital to have dwindled by one half or more, it is liable to be closed at once. The law also lays down stringent provisions as to the accumulation of a reserve fund. Under the liberty allowed to them the banks employ their funds by preference for productive purposes, discounting acceptances, advancing money on security, lending on mortgage. They lend money freely to co-operative popular banks. Out of their profits they make liberal grants for technical education, for the support of hospitals and other public uses. They also make advances in a semi-philanthropic way to small cultivators at low interest. This practice was first introduced by the excellent savings bank of Imola. The savings bank of Parma does much for agricultural education, and is with the help of its money starting a number of co-operative village banks. Under the "free" system the strong banks thrive exceedingly well, and are found admirably safe and useful. But there are a number of weak ones which become insolvent and have to be wound up.

The Post Office banks were called into being in 1875 by a measure prepared by M. Luzzatti under Sella. They are modelled on our own, but take stamp deposits down to 5 c. ($\frac{1}{2}d.$). There were at the close of 1893 4,679 Post Office savings banks in operation, holding the vast majority of savings accounts, but by far the smallest amount of funds. They are not intended to compete with other savings institutions, but to supplement them. They allow 3 per cent. interest. Their funds are administered as a special account, all surpluses remaining to the credit of the department. It is proposed to devote them sooner or later to some useful public purpose.

The following are the latest figures published, being the figures for the year 1893:—

	Number.	Number of Accounts.	Deposit Balances, 31st December, 1893.
			lire.
Ordinary savings banks	395 (388 reporting)	1,475,008	1,258,052,466
Banche Popolari	654 (608 reporting)	279,663	205,343,573
Ordinary credit institutions ..	108 (96 reporting)	165,412	113,589,900
Post Office savings banks.....	4,679	2,662,908	398,598,055
Total	5,771 reporting out of 5,836	4,582,991	1,975,583,994

The average value of a Post Office savings bank account is shown to be 149·69 lire, that of an ordinary savings bank account 852·91 lire, that of a *banca popolare* account 734·25 lire, and that of an ordinary credit institution account 686·71 lire, giving a mean average of 431 lire. The amount of deposits is 69·42 lire per inhabitant generally.

Spain.

Saving is still little developed in Spain. In 1892 M. Laurent found only 39 savings banks in existence, including those in the colonies. Most of them are attached to *Monts de Piété*, and employ their funds so far as is required for advances on pledges and similar security, loaning out the balance in other ways. Among establishments so constituted is the Savings Bank of Madrid, which is by far the largest, and took in 1895 14,619,189 pesetas (or francs) in 78,305 deposits, against which 15,788,585 pesetas was withdrawn in 30,106 sums. The sum of 1,414,138·72 pesetas was allowed in interest. At the close of 1895 the savings bank held 48,630,731·94 pesetas in deposits in 44,522 accounts. This bank is subject to the control of the Ministry of the Interior, which appoints the administrative council, who in their turn elect from their midst directors acting as an executive. The next largest savings bank is that of Barcelona, which holds about 600,000*l.* in deposits, and is a *Mont de Piété*, like that of Madrid. The bank of Viscaya (Bilbao) is a savings bank only, and holds nearly the same amount. The remainder appear to be insignificant.

Portugal.

In Portugal the number of free savings banks existing is very small, and their business appears trifling. The Government savings bank established in 1885, which collects savings under government guarantee, through the Post Office, tax collectors, and other official channels, receives sums from 100 reis (5*d.*) upwards to 500,000 reis (112*l.*), allowing interest (from 1,000 reis (4*s.*), upwards) at a rate varying between 3 and 4 per cent., at present apparently of 3·60 per cent. Deposits are allowed to accumulate up to 1,500,000 reis (336*l.*), beyond which figure no interest is allowed, except to certain privileged bodies. Excess amounts are required to be withdrawn or else are automatically invested in public securities. The funds have to be handed over to a body resembling the French *Caisse des Dépôts et Consignations*, which holds them in current account, paying 5 per cent. upon them, but keeping them distinct. All profits accruing are credited to the savings bank, and carried to reserve, to be employed, above all things, in covering occasional losses. Every few years so much of the overplus as can be spared may be divided *pro rata* among depositors by way of bonus. At the end of October, 1890, the Portuguese savings bank held 2,450,355 milreis (about 500,000*l.*) in deposits, in 11,314 accounts.

Russia.

In Russia the State bank, being a public institution supported by the national credit, receives deposits through the medium of agencies appointed by itself. The smallest deposit receivable is

25 kopeks, the maximum allowed, 50 roubles. Deposits are not allowed to exceed 1,000 roubles in all. The formalities to be submitted to in making a deposit are very troublesome. Interest is allowed at the rate of 4 per cent. Finland and Poland have distinct savings institutions similarly organised. In Poland the savings banks are placed under the direct control of the Minister of Finance. The minimum deposit allowed is 15 kopeks, the maximum 3 roubles a week, and 150 roubles a year. Balances must not accumulate beyond 300 roubles. The moneys received have to be handed over to the State bank, which pays $4\frac{1}{2}$ per cent. upon them, and applies them as State interests may require.

Post Office savings banks were introduced into Russia in 1889. They are really only receiving offices for the State bank like the others, and are bound to hand over all their funds to that institution. However, in respect of administration they are subordinated to the Minister of the Interior. On 1st October, 1894, there were in Russia 3,180 savings banks of both descriptions, holding among them 329,432,360 roubles in 1,597,412 accounts. In Finland there were 136 savings banks, holding about 1,860,000*l.* in deposits.

Greece.

In Greece the national bank has power to establish savings banks, making itself answerable for the sums deposited, reaping all the profit, and bearing all the loss. Whatever savings banks are established under its authority are bound to be kept open a certain time on Sundays. They are to receive savings of not less than 3 or more than 100 drachmas (francs), and to allow interest at the rate of 4 per cent. up to 1,000 drachmas. The national bank may close such banks as well as establish them at its pleasure, and call upon depositors to withdraw their deposits.

Egypt.

The Government of Egypt has made several attempt since 1881 to establish government savings banks. In 1888 it tried to introduce Post Office savings banks. The attempt, however, proved abortive. And at present, apart from some savings banks established purely for the use of officers of the Egyptian postal service, the customs, and the mail boats, the only bodies collecting savings are the Imperial Ottoman Bank, the French *Société des Monts de Piété*, and the French branch Post Offices at Alexandria and Port Said. These receiving places are governed by the French law. The French *Monts de Piété* take deposits like any ordinary bank from 100 frs. up to 3,000 frs., allowing thereupon 3 per cent. interest. The Imperial Ottoman Bank since 1st July, 1881, takes at its offices at Cairo, Alexandria, and Port Said deposits from 6·25 frs. up to 2,500 frs., allowing likewise 3 per cent. On 1st July, 1891, it held only 1,181,702·50 frs. in deposits in 1,399 accounts. The glaring disproportion between the interest which it allows and the ordinary rate of 12 per cent. usual in Egypt is said to account for its want of success in seeking to attract savings.

Japan.

Japan possesses some hundreds of private savings banks, with

regard to which I have not been able to ascertain anything definite Such banks may be maintained as either private or communal institutions, and are governed by what appears to be a Japanese equivalent to our companies' Act. They must submit to registration, which is made dependent, among other things, upon their showing that they have a subscribed share capital of at least 30,000 yen (something over 3,000*l.*). They may be required to publish half-yearly balance sheets. Their managers are absolutely liable for any loss. The banks are subjected to strict control by the Treasury, and are required to deposit public securities to a fixed amount as caution money.

Since 1874 there is a regular system of Post Office banks, well developed and extending largely. There are now 3,030 offices open for the receipt of savings. They take deposits of 10 sen (about 2½*d.*) up to 50 yen (5*l.*) on one day. The maximum deposit is 500 yen (50*l.*), beyond which depositors are free to invest in Japanese consols. At the present time the interest allowed to depositors is at the rate of 4⅕ per cent. The funds are paid into the Bank of Japan to the credit of the Treasury, which administers them at its pleasure and holds itself responsible. The growth of business has been very considerable. In 1875 only 15,224 yen (1,522*l.*) was deposited. About a year ago, in March, 1896, the 3,030 offices open held 28,965,427 yen (2,896,543*l.*) in deposits, in 1,223,085 accounts, at the rate of not quite 24 yen per account. In addition, there were 1,122,200 yen (112,220*l.*) invested on depositors' account in Government securities.

Hawaii.

Hawaii, *alias* the Sandwich Islands, is one of the latest converts to the principle of Post Office savings banks. It has been, since 1st July, 1886, allowing 5 per cent. interest on sums from 1*s.* upwards to 500*l.* The funds are invested in public securities. In 1890 the 72 post offices had among them 2,641 depositors, with $956,999 standing to their credit.

Brazil.

In Brazil the savings banks (*caixas economicas*) are government institutions, generally connected with *Monts de Piété* (*Montes de Soccorro*). Both are under the supervision of the Ministry of Finance, and the one service supplements the other. The savings banks receive on deposit small sums (in Rio de Janeiro from 2*s.* upwards) up to a maximum of 4,000,000 reis (about 400*l.*), on which they allow interest at the rate of 5 per cent. on each 100,000 reis (10*l.*) deposited. Deposits must not exceed 50,000 reis within seven days. The funds collected are handed over to the government, which may deal with them as it pleases. Unauthorised bodies or persons collecting savings are subject to heavy fines. In the capital savings bank business is brisk. On 31st March, 1895, the savings bank of Rio de Janeiro held in balances 63,329,841,557 reis (about 6,000,000*l.*), showing an increase upon the year of 26,769,207,137 reis. The balances to the credit of depositors in the provinces on 31st December, 1895, are given at about a similar amount,

namely 60,000 contos (*i.e.*, millions of reis). The deposits of the year are about 46,000,000,000 reis, the withdrawals about 26,000,000,000 reis.

The United States.

There is no federal law in the United States governing the practice of savings banks. Every State legislates for itself. But in general the laws are very much of a piece. Up to 1870 the savings banks enjoyed absolute freedom; but their growth and development was slow. Between 1870 and 1877, the period of general crises, there were a good many collapses and failures. In New York State alone 29 savings banks failed, inflicting a loss of about $5,000,000 upon depositors. Inquiry showed that it was the badly managed banks which failed. In marked contrast with British experience, it was in the United States not so much office mismanagement and fraud, as imprudent investment, which led to loss. The well managed savings banks profited by this period of crisis. The deposits in the Philadelphia Saving Fund Society, the oldest savings bank in the States, established in 1816, just doubled during the time. Under the exciting effect of the crisis more States than one passed new laws with regard to savings banks. By common consent the most perfect of such is that adopted by the Legislature of New York, which the others more or less resemble. Under that law the formation of savings banks with capital stock is prohibited, and trustees are debarred from having any direct or indirect interest in the profits. Savings banks are declared corporations with corporate power. There must be at least thirteen persons to form and administer one, two-thirds of whom at least are required to be residents in the particular locality. The new bank must, however, first obtain a formal sanction from the bank superintendent, a State officer, who has discretionary power. One of his duties is to inquire whether there is scope in the particular district for the action of a bank. The savings bank being once approved and properly constituted, the board of management have full freedom with regard to regulations, but are required to report regularly to the bank superintendent. The investments permitted are: public securities of the United States, or of the particular State, or of any State of the Union which has for ten years previously properly paid interest and repaid capital (if required); moreover, of any city, county, schoolboard district or parish board; also mortgages on real estate up to 60 per cent. of the total deposits, and 40 per cent. of the ascertained value of the particular property; likewise real estate for the use of the bank; and bank deposits. There is no restriction as to limits. And the non-limit system has been found to work well. Under it, as Mr. E. E. Werner writes in the *Encyclopædia Americana*, the savings banks have "proved attractive depositories for surplus money of all classes, and every effort, by legislation or otherwise, to restrict them to dealings with the poor alone have failed. The widening of the area of their operations, so as to embrace a higher order and greater number of beneficiaries, has had a salutary effect. Experience has demonstrated that these institutions lose none of their efficiency as promoters of industry,

sobriety, and thrift among the poorer classes, from the reason that others more favoured are allowed to share in their profits."

Under the New York law it is provided that the profits earned shall go to the depositors as far as is possible. However, interest on deposits is never to exceed 5 per cent. A reserve fund is to be laid up, accumulating till it reaches 15 per cent. of the total deposits, independently of a reserve fund of 10 per cent. made obligatory under Clause 261. Any excess accumulated above 15 per cent. of the deposits is to be from time to time distributed equitably among depositors. The bank superintendent has power at any time to institute an inquiry into the affairs of a savings bank, in order to verify the figures of the report to be annually presented on 1st February, and to satisfy himself of the good management of the banks. To provide funds for such inspection each savings bank is required to pay an annual contribution of $5.

Under the system of freedom, coupled with stringent inspection, the United States savings banks have grown up flourishing institutions. According to the Annual Report of the Comptroller of the Currency for the year ended 31st October, 1895, 1,017 savings banks in that year submitted returns. Of these 664 were mutual, *i.e.*, associations conducted for the sole benefit of depositors. The remaining 353 were stock savings banks, operating for the benefit of both shareholders and depositors. The resources of the stock savings banks are shown to be less than 15 per cent. of the total. With the exception of ten banks in Ohio, Indiana and Wisconsin, however, the mutual savings banks are confined to the Eastern and Middle States. Banks of this type held $1,597,343,160 in deposits. Their loans were reported at $823,036,954, their bonds and shares at $801,044,935, and their total resources at $1,756,740,953. The deposits of all savings banks are given at $1,844,357,798 ($33,760,775 subject to check, $1,810,597,023 savings deposits). The aggregate loans stood at $1,035,597,142, the bonds and stocks at $841,807,699, and the total resources at $2,053,764,328. This marks an advance upon the figures for 1894 of $66,424,556 in deposits, $8,659,334 in loans, $63,219,833 in bonds and stocks, and of $73,020,139 in total resources. The number of depositors had likewise increased by 97,832. The average amount due to each depositor is returned at $371·30, as compared with $365·86 in 1894. The interest allowed on deposits averaged a trifle over 4 per cent., the minimum being 3·2, the maximum 4½ per cent. Among the bonds and stocks held there were only $123,196,916 United States bonds, as compared with $718,610,785 others. The capital of the stock savings banks was $29,465,573. The surplus and profits amounted to as much as $174,109,899. Some of the individual savings banks appear remarkably prosperous. Thus the Philadelphia Savings Fund Society is shown by its last report to have held at new year, 1897, 165,198 deposit accounts, amounting to $41,576,204·44, in addition to a contingent fund of $11,973,033·24, that is $46,549,237·68 in all (9,172,137*l.*). The Bowery Savings Bank of New York held at new year, 1897, $57,556,106·66 in deposits on 114,513 accounts (3,199 more than a twelvemonth before), in addition to $5,948,450·89 contingent fund or surplus, making $63,504,557·55 in all.

British Colonies.

India.

India has "Government savings banks" in the Presidency towns, whose business is generally declining. Their collective deposits went down between 1893 and 1894 from Rx. 1,107,420 to Rx. 1,083,253. There are also regimental savings banks, whose deposit balances went up in the same period from Rx. 116,364 to Rx. 146,172; moreover, railway provident funds and similar institutions for the receipt of savings, whose business appears to be gradually growing. But the main collection of savings is done by Post Office savings banks, which are, of course, altogether under Government direction, and are bound to deliver up their takings to the Government, which is answerable for it, and employs it as it sees fit. There were on 31st March, 1896, 6,343 post offices receiving savings, viz., 291 head banks, and 6,052 sub-banks. They take deposits from 4 annas upward, but only in sums of 4 annas, or of multiples of that figure, and never more than Rs. 200 from one depositor in one year, and Rs. 2,000 in all. The authorities control the use made of savings banks closely, and have power to close an account "should they have reason to believe that the depositors had used the savings bank for the purpose for which it was not intended." Interest is at present allowed at the rate of $3\frac{1}{8}$ per cent. The savings banks also purchase government securities for depositors, and take securities from them for safe custody. There were on 31st March, 1896, 653,892 deposit accounts open in the Indian Post Office banks, amounting in all to Rx. 9,092,307 (about 5,700,000*l.*).

The progress of the Post Office bank in India may be gathered from the following figures:—

	Native Depositors.	Amounts.	European and Eurasian.	Amounts.
		Rx.		Rx.
31st March, 1885	109,244	1,110,717	13,315	233,474
„ '89	273,696	5,008,203	37,305	878,265
„ '93	466,897	6,845,604	54,070	973,168
„ '96	593,590	7,752,680	60,312	1,289,627

British Crown Colonies.

In British crown colonies the system of savings banks in use is essentially alike throughout. In the smaller colonies the Treasury collects. As the colony grows a special savings banks department is established; after a time a cluster of savings banks. Government officers direct the service; and the government employs the funds, as a rule "as the Governor in Council shall direct;" sometimes, "with the approval of the Principal Secretary of State for the Colonies." Or else the phrase runs, "as the Principal Secretary of State for the Colonies may approve"—"in England, in such securities as the Secretary of State shall name," and in some colonies the restriction is added, "provided always that no part of such monies shall be applied in any way to the purposes of this colony." The following are the principal figures culled from the latest official reports:—

Colony.	Year.	Interest.	Limits.	Number of Accounts.	Amount of Deposits.
		Per cent.			
Falkland Islands	1895	$2\frac{1}{2}$, may be increased to 3	None named	282	34,415*l.*
St. Helena	'95	$2\frac{1}{2}$ on every complete £	No interest appears to be allowed above 400*l.*	164	15,016*l.*
Lagos	'95	$2\frac{1}{2}$	Minimum 1*s.*	543	9,411*l.*
Seychelles	'95	$3\frac{1}{2}$	„ $\frac{1}{2}$ rupee; maximum 2,500 rupees (3,000 rupees including interest)	No	figures
Ceylon	'92	(?)	Minimum 50 cents; maximum 3,000 rupees	—	2,567,225 rupees
Post office savings banks	'93	(?)			606,418 „
Mauritius	'95	(?)	„ 1*s.*; maximum 250*l.* (300*l.* with interest)	23,327	317,404*l.*
Gold Coast	'95	$2\frac{1}{2}$	Minimum 1*s.*; no interest above 500*l.*	388	5,579*l.*
Straits Settlements*	'95	3	„ 1 dol.; maximum 750 dols.	1,688	248,449 dols.
Sierra Leone†	'95	—	— —	2,982	35,139*l.*
Gambia	'95	$2\frac{1}{2}$	— —	738	2,565*l.*
Bahamas	'95	$2\frac{1}{2}$	Maximum 150*l.*	950	8,603*l.*
Turks Islands	'95	—	— —	144	974*l.*
Bermuda‡	'95	$2\frac{1}{2}$	Minimum 2*s.*; maximum 100*l.* (150*l.* including interest)	1,006	17,981*l.*

* 136,000 dols. invested in municipal debenture stock; 14,867·57 dols. is held in current balances at joint stock banks.

† Since 1896 all business is transferred to the new Post Office savings banks. Interest $2\frac{1}{2}$ per cent. Minimum 1*s.*; maximum 200*l.* No interest paid above 100*l.*

‡ The Receiver General has authority to issue Treasury debentures in 50*l.* bonds up to 2,000*l.*

Colony.	Year.	Interest.	Limits.	Number of Accounts.	Amount of Deposits.
		Per cnt.			
Jamaica	1895	3	Minimum 1*s.*; maximum 400*l.*	27,366	464,737*l.*
Saint Lucia	'95	3	„ 1*s.*; „ 100*l.*	1,275	9,267*l.*
St. Vincent	'95	2½	„ 1*s.*; no interest beyond 100*l.*	1,012	9,167*l.*
Grenada	'94	3	„ 1*s.*; maximum 200*l.* (no interest beyond)	959	7,602*l.*
Barbados	'95	3	Minimum 1*s.*; maximum 300*l.* (no interest beyond)	11,289	180,584*l.*
Trinidad and Tobago	'95	3	Minimum 1*s.*; maximum 500*l.*	9,703	195,269*l.*
St. Christopher and Nevis	'95	3	— —	441	10,939*l.*
Montserrat	'95	(?)	Maximum 150*l.* (200*l.* including interest)	125	(?)
Dominica	'95	3	Minimum 1*s.*; maximum 150*l.*	276	4,371*l.*
Honduras	'95	(?)	„ 1 dol.; „ 1,000 dols.	292	20,998 dols.
British Guiana	'95	(?)	„ 24 cents; „ 1,500 „	13,078	233,226*l.*
Post office savings bank	—	—	— —	6,812	25,919*l.*
Gibraltar	1895	5 centimos per mensem on every complete 25 pesetas (1*l.*)	Minimum 1 peseta; maximum 25,000 pesetas	3,588	4,507,803 pesetas
Malta	'95	(?)	„ 1*s.*; no interest beyond 100*l.*	6,063	473,042*l.*

Canada.

There are three different kinds of savings banks at work in the Dominion, apart from which chartered banks take small deposits in considerable amounts, and there are also friendly societies, and loan and building societies of the United States order, and moreover a fair number of penny banks, three in Toronto alone. The three types are these: there are, first, the two old "special" savings banks, the *Caisse d'Économie* of Quebec and the Montreal City and District Bank, organized on the joint stock principle, whose charters have been renewed, and which are employed mainly by the French Canadians, wedded to old ways. These two banks enjoy almost entire liberty as to management and investment of funds, with this proviso, that 20 per cent. of their holdings in deposits must be invested in Dominion securities or in deposits in chartered banks. Beyond that they are free to invest in any stock or public security of Canada or of any province of Canada and in municipal debentures that they choose to select. They may also lend money on the personal security of individuals or corporate bodies, provided that satisfactory collateral security is given not consisting of sureties, but they are precluded from issuing notes. Their business is large and increasing. On 30th January, 1895, they held, between them, in savings $13,128,483 out of a total in Canada of $57,578,981.

The "Government savings banks," which are confined to the maritime provinces and Manitoba and British Columbia, are under the control of the Governor. The funds collected go to the Treasury, and form part of the unfunded debt. The minimum deposit is $1, the maximum $1,000. Interest is allowed at the rate of $3\frac{1}{2}$ per cent. There were in 1895 35 such savings banks, holding on 30th January, 1895, $17,644,956 in deposits in 54,932 accounts, which is less by 883 than in 1894. The amount is likewise steadily decreasing. In 1886 it stood at $21,334,525. Most of these savings banks (22) are in Nova Scotia, 8 in New Brunswick, 2 in Prince Edward's Island, and 1 each in Ontario, Manitoba, and British Columbia.

The Post Office savings banks have been in operation since 1st April, 1868, under the Act of 1867, which was extended to the whole Dominion in 1885. They are steadily attracting the principal business. Their business has exactly doubled in eleven years. They are most active in Ontario, where there are 448 offices, 88,115 depositors, and $18,700,961 of deposits, giving an average per head of the population of $8·50. The funds are administered by the government, and treated as part of the unfunded debt. The minimum deposit taken is $1, the maximum $1,000. The maximum balance allowed is $3,000. The interest allowed is $3\frac{1}{2}$ per cent. On 30th January, 1895, there were 731 post office savings banks in existence, holding among them $26,805,542 in deposits in 120,628 accounts; that is, at the rate of $222·22 per deposit, and $5·27 per head of the population. The total amount stated for all three varieties of savings banks is $57,578,981, which is at the rate of $11·11 per head of the population.

Newfoundland.

The "Newfoundland Savings Bank," authorised under the Act of 1834, is a Government institution. The funds are invested "upon real, personal, or Government securities." The profits are constituted a sinking fund for the redemption of the public debt of the colony. The Governor may limit the maximum balance on which interest is payable to $250. Interest is allowed at the rate of 3 per cent., but not on less than $4 or on fractions of dollars. At the close of 1894 this bank held $2,821,423·78 of deposits in 6,401 accounts. Its investments represented a value of $2,893,405·78, in addition to a reserve fund of $114,649·30.

An Act authorising the government to establish post office savings banks was passed in 1891, but no action appears to have been taken upon it.

The Cape.

There are two trustee banks of old foundation in the Cape Colony, namely, the Cape of Good Hope Savings Bank Society and the King William's Town Savings Bank. The Act lays it down that the entire profit is to benefit the depositors. There is nothing said about minimum or maximum, or rate of interest. The directors are to "lay out and invest" the funds "upon such colonial securities as they shall think fit." The deposits in the hands of these two banks at the close of 1895 were 163,130*l.* in 6,489 accounts, namely 99,362*l.* in 4,910 accounts (showing a marked increase, nearly double of what was held in 1891) in the Cape of Good Hope Savings Bank, and 63,708*l.* in 1,578 accounts (showing likewise an increase, but not equally marked) in the King William's Town Savings Bank. There is, however, in the holdings of both a decided decrease in comparison with the figures before Post Office savings banks were introduced. In 1881 the holdings of the two were 334,337*l.* in 9,971 accounts.

The Post Office savings banks have attracted the lion's share of the savings banks business. The deposits are secured by the public revenue, but the savings banks funds are administered as a distinct account, benefiting by good investments and by profits accruing. The Post Office has power to issue, to depositors only, savings banks certificates of the value of 100*l.* each, paying interest at the rate of 3 per cent. The minimum deposit in the Post Office banks is 1*s.*, the maximum 100*l.* in one year, or 500*l.* in all, which may be raised by interest accumulating to 600*l.*, beyond which no interest is allowed. The present rate of interest is still 3*l.* 6*s.* 8*d.* per cent., but as moneys must be invested in Cape stock, which at the present purchase price pays only $2\frac{3}{4}$ per cent., the interest will in all probability have to be reduced, unless the powers of investment are enlarged. The older holdings, paying at the rate of 4 and 5 per cent., enable the Post Office to continue allowing the higher rate. Deposits increase steadily and considerably. On 31st January, 1896, the holdings in these banks were 1,240,953*l.* 17*s.* 6*d.* in 43,672 accounts, besides 294,100*l.* in certificates, 1,535,053*l.* 17*s.* 6*d.* in all. The entire savings banks

deposits in the Colony thus amount to 1,698,123*l.* 17*s.* 6*d.* in 50,161 accounts, that is, nearly 34*l.* per account, and a little over 1*l.* per inhabitant.

Natal.

The "Government Savings Bank" of the colony is under the management of the Colonial Treasurer. The deposits are secured by the guarantee of the colony. The management expenses are defrayed by the colony. Seven-eighths of the amount collected may be invested in one or more securities of *any* colony or dependency of Great Britain. The minimum limit for deposits is 2*s.* The maximum is 25*l.* per day, 100*l.* in all. The rate of interest at present stands at 4 per cent. The deposits on 30th June, 1895, stood at 172,304*l.* in 6,963 accounts.

New South Wales.

The old "Savings Bank of New South Wales," established in 1832, is administered by trustees. It is permitted to invest its funds in "investments of a general nature," such as mortgages, government and municipal securities, and deposits with banks of issue, and with the Treasury. It takes deposits from 1*s.* upwards, upon which it allows interest at the rate of $3\frac{1}{2}$ per cent., but adding to that interest if the account is continued open at the close of the year. The higher rate is not fixed, but at present stands at 4 per cent. No interest is allowed beyond 200*l.* At the close of 1895 the bank held 3,951,875*l.* in deposits in 71,099 accounts, as compared with 3,583,375*l.* in 67,512 accounts a twelvemonth before. At the close of 1894 the investments consisted of 1,183,502*l.* in mortgages, paying at the rate of 5·81 per cent., 75,617*l.* in government and municipal securities, paying at the rate of 5·26 per cent., 759,169*l.* Treasury bills (4·25 per cent.), 899,108*l.* fixed deposits with banks of issue (4·73 per cent.), 787,499*l.* fixed deposits with the Treasury (4·14 per cent.). Cash in hand 116,790*l.* Reserve fund and depreciation 238,268*l.* Assets in hand stood as 1*l.* 1*s.* $3\frac{3}{4}$*d.* to 1*l.* liabilities.

The Post Office savings banks were established in 1871. In 1895 there were 499 open. Maximum and minimum limits were the same as in the savings bank of New South Wales, but the interest allowed is uniform at 3 per cent. The funds are kept as a distinct account, but invested only in Government securities. At the close of 1895 the deposit balances amounted to 4,121,700*l.* due on 131,703 accounts, as compared with 3,633,925*l.* in 122,795 accounts in 1894. The assets of the banks include 5,241*l.* surplus. The total amount held in deposits by both classes of savings banks accordingly was at the close of 1895 8,073,575*l.*, being 6*l.* 6*s.* 4*d.* per head of the population. There were sixteen depositors to 100 population. In 1894 the average amount of each deposit was 37*l.* 18*s.* 5*d.*

In addition to the two kinds of savings banks there are school savings banks in all public schools, numbering at the close of 1894 631, holding 6,049*l.* in deposit balances. Deposits are also freely

taken in ordinary banks. The deposits in saving banks have grown from 4,730,469*l.* in December, 1890, to 8,073,575*l.* in December, 1895.

Queensland.

Queensland has now no savings banks except those connected with the Post Office. At the close of 1895 there were 129 offices open. The savings banks take deposits from 1*s.* up to 200*l.*, upon which they allow 3 per cent., being in their turn credited with $3\frac{1}{2}$ per cent. by the government, which employs the funds, investing them in government debentures, fixed deposits and current accounts. Balances over 200*l.* are automatically invested in government debentures in units of 10*l.*, the interest allowed not exceeding $3\frac{1}{2}$ per cent. The profits netted and credited to the banks vary. They were in 1893, 8,827*l.*; in 1894, 14,068*l.*; in 1895, 5,376*l.* The balances in the hands of the savings banks at the close of 1895 stood at 2,286,810*l.* in 56,421 accounts, marking an increase upon the year of 190,918*l.* and 4,944. The average of each deposit is 40*l.* 10*s.* 7*d.* Deposit per head of the population : 4*l.* 19*s.* 4*d.* Depositors per 100 population : 12.

South Australia.

The Savings Bank of South Australia, the only one in the colony, is a trustee bank, controlled by the government. The bank has 134 agencies, but half the business is done in the city of Adelaide. The trustees are entitled to lend out the funds on the security of mortgage of any messuages, lands or hereditaments held in fee simple, or in tenure equivalent to fee simple, provided that such property is situated within the province of South Australia, but only to the extent of one half of the entire funds to be invested ; also in Government securities of the said province, and in securities guaranteed by that Government, or in or upon the securities of any corporate town within such province, and also in deposits in a bank. They are required to create a reserve fund out of the profits for the purpose of meeting any loss or deficiency, until that fund amounts to 4 per cent. of the deposits held. After that, the profits are to be divided among the depositors *pro rata*, at the rate of one or more £, or one or more 10*s.*, per depositor. Any balance remaining is to be carried forward. The Acts in force provide for an effective and searching government audit. The minimum deposit is 1*s.*, the maximum holding 500*l.*; but no interest is allowed beyond 250*l.* The present rate of interest is 4 per cent. At the close of 1895 the savings bank held 2,691,272*l.* deposits in 86,734 accounts. The average amount of each deposit was 31*l.* –*s.* 7*d.* There were twenty-four depositors per 100 population, and 7*l.* 10*s.* 7*d.* deposited per head of the population. In 1895, 5,000*l.* was carried to reserve, raising the reserve fund to 75,000*l.* The investments include 1,203,659*l.* 12*s.* 8*d.* in mortgages at 5 per cent.; 946,012*l.* 14*s.* 11*d.* in Government and corporation securities ; and 365*l.* in fixed deposits.

Victoria.

There are in Victoria "Commissioners' Savings Banks," which are Trustee savings banks under Government direction, and also Post Office savings banks. Each Commissioners' savings bank forms a distinct institution. There are now 18 such banks, with 19 branches, 37 in all. The savings banks moneys are dealt with as a distinct fund. The Commissioners are free to invest in mortgage securities or in Government debentures and Treasury bills, or in deposits with the Treasury or with banks, and may lend to these bodies, to the Corporations of Melbourne and Geelong, and to the Council of any shire or borough to an extent not exceeding the threefold of the aggregate revenue of each corporation, and for not longer than five years, at a rate of interest not exceeding 8 per cent. Under power obtained in 1894 the Commissioners may also advance money to farmers on the ground of a valuation in loans repayable by annuities at 5 per cent. interest, besides sinking fund. This business, which the Commissioners evidently favour, in view of the otherwise "very limited field open for investment," is on the increase. The Commissioners' report says with regard to it: "Many farmers have been enabled with the money borrowed to purchase stock and make improvements, thus increasing the income-earning value of their holdings. Of the money advanced (151,257*l.* 11*s.* 8*d.* up to 30th June, 1896) 9,013*l.* 17*s.* 10*d.* has been used for payment of Crown rents to make land freehold; and, so far as can be ascertained approximately, about two-fifths has been used to pay off liabilities." "It should not be forgotten," so the Commissioners explain, "that the value of the farmers' loan business is reciprocal, as the Commissioners must find profitable employment for the ever-increasing funds of depositors, and, as the old mortgages are gradually being paid off, some new outlet is necessary to maintain the self-supporting character which has appertained to the Commissioners' savings banks during the forty-three years of their independent existence." Between 10th April, 1894, and 30th June, 1896, the Commissioners received applications for loans from 1,103 farmers in respect of 598,437*l.* 13*s.* 10*d.* in all. They caused 819 valuations to be made, and rejected 284 applications as unsuitable. They lent out 151,257*l.* 11*s.* 8*d.* in all, of which sum 90,046*l.* 7*s.* 8*d.* was granted within the twelvemonth immediately preceding 30th June, 1894. The interest is 5 per cent. plus 2 per cent. sinking fund. All instalments thus far due have been paid. "The Commissioners have endeavoured to instil into the minds of borrowing farmers the first importance of punctuality in making repayments, without which the system must fail to become permanently useful, and in this they have met with notable success. The security conferred by the Commissioners' mortgage terms is a feature much appreciated by the farmers; but the reduced rate of interest and the provision for gradual redemption also greatly encourage self-help." The Commissioners take deposits from 1*s.* to 1,000*l.*, or more if the Supreme Court or one of the Judges should make an order to that effect.

They pay interest at the rate of 2½ per cent. on balances up to 100*l.*, 2 per cent. beyond, and no interest at all beyond 250*l.* On 30th June, 1896, they held 4,328.775*l.* 12*s.* 4*d.* deposit balances in 215,685 accounts, marking an increase of 191,416*l.* 13*s.* 2*d.* and 5,037 accounts on the preceding year. The average deposit stood at 20*l.* 1*s.* 5*d.* The expenses of management are shown to be steadily decreasing. They now stand at 13 per cent., and amounted in the last year to 27,816*l.* 11*s.* 4*d.* The gross profits earned were 3*l.* 8*s.* 5*d.* per cent., the interest actually paid to depositors was 2*l.* 2*s.* 4*d.* per cent. The net profit left after all expenses being deducted was 26,666*l.* 17*s.* 9*d.* Among the investments 46·18 per cent. stand for Government and municipal securities, 8·54 per cent. for bank deposits, 42·19 per cent. for mortgages and foreclosed properties, 3·09 per cent. for other items.

In addition to these "Commissioners' savings banks," there are nearly 400 Post Office banks allowing 3 per cent. on deposits. They held on 30th June, 1895, 3,128,128*l.* on 125,883 accounts, showing a steady increase. That raises the total of deposits in the Colony up to date named to 7,265,486*l.* 19*s.* 2*d.* in 336,531 accounts, which is at the rate of something over 23*l.* per account, and 6*l.* 7*s.* 6*d.* per inhabitant, giving about thirty depositors per 100 population. At the close of 1895 the deposits stood at 7,316,129, giving 6*l.* 3*s.* 10*d.* deposit per head of the population, and showing twenty-nine per 100 population to be depositors.

Western Australia.

Western Australia has only Post Office banks. They are under the authority of the Governor, and the Colonial Treasury is responsible for all deposits lodged. They take deposits from 1*s.* upwards to 150*l.* in one year, and 600*l.* in all, allowing interest at the rate of 3¾ per cent. on every full £ up to 300*l.* There were in 1895 24 offices taking savings, which held in all 460,610*l.* in deposits on 16,160 accounts, showing an increase upon 1894. The average deposits stood at 28*l.* 10*s.* The department is allowed considerable latitude in the investment of funds. It may deposit funds with joint stock banks in the Colony at a rate of interest to be agreed upon, or in Government securities, or in any public debt contracted under legislative authority, in shares and other securities bearing good rates of interest, guaranteed by the Government; also it may lend on mortgage on estates free of encumbrances up to three-fifths of the value ascertained by valuation, and up to 7,000*l.* in respect of any particular loan. Up to 1896 the maximum limit was 3,000*l.* In the Session of 1896 it was proposed to raise the figure to 10,000*l.*, and both Houses of the Legislation were favourable. The Premier, Sir. J. Forrest, said: "There is a difficulty in lending the money of the Post Office savings banks satisfactorily, and there is between 200,000*l.* and 300,000*l.* (the Minister of Mines, Mr. E. H. Wittenoom, subsequently gave the correct figure as between 300,000*l.* and 400,000*l.*) awaiting investment. Of that amount 220,000*l.* will go for the Perth waterworks, and then a considerable amount will be left. The alteration of the law will lead to a larger amount being deposited." The

Prime Minister also proposed that the Post Office savings banks should be authorised to invest savings bank funds in the purchase of debentures issued by municipalities in accordance with the Municipal Institutions Act. "Hon. members will remember that some time ago, before we amended and consolidated that Act, there was power given to lend money to municipalities; but when the Act was consolidated that power was withdrawn. On further consideration, however, we find that in the way we propose to authorise the lending of money to municipal institutions the power to do so will not only be of benefit to them but also to the savings banks as well. . . . . A short time ago there was a difficulty in getting many people to invest their money in the municipal debentures of Perth and some other towns of the Colony, although the debentures were a good and safe investment. The Government was asked by the member for West Kimberley, the Mayor of Perth (Mr. A. Forrest) whether the savings bank would take the unsubscribed balance of the loan of the city of Perth. And when we consented to do so, nearly the whole of that loan (15,000*l.* out of 19,000*l.*, taken at par) had to be advanced by the savings bank." This was at 5 per cent. The Government still hold the loan, and, as the premier stated, consider the security good. Mr. A. Forrest interjected that the Government had made a good profit on the loan. "The Government are of opinion," so the premier went on, "that it will be perfectly safe to invest savings bank funds in the purchase of debentures issued by municipalities in accordance with the Municipal Institutions Act." Minister Wittenoom added in the Legislative Council that "unless some means of investment are provided, the Government will make a loss on the bank." Power was given, and, "not to go too fast," the maximum allowable to mortgages was fixed at 7,000*l.*

Tasmania.

Tasmania has two large private Trustee savings banks, established on the joint stock principle, which do by far the largest amount of business, leaving the Post Office banks, established in 1882, to do only one-fifth of the whole. Of the two, that of Hobart Town (established in 1845) is the larger. It held on 28th February, 1895, 310,037*l.* 17*s.* 9*d.* in 12,497 accounts, giving an average of 24*l.* –*s.* 2*d.* to every depositor, as compared with 200,133*l.* 16*s.* 7*d.* on 11,139 accounts, giving an average of 17*l.* 18*s.* 4*d.* per depositor, in the Launceston Bank (established in 1835), that is, in all, 510,171*l.* 14*s.* 4*d.*, as against 99,061*l.* 18*s.* 1*d.* in 5,236 accounts, giving an average 18*l.* 18*s.* 4*d.* in the Post Office bank, at the close of 1894. On 1st July, 1895, the private savings banks held 533,089*l.*, and the Post Office bank 114,994*l.* The regulations as to a minimum limit of 1*s.* and a maximum of 200*l.* apply to both classes of banks; both allow interest only up to the limit of 150*l.* The rate of interest allowed in the post office banks is $3\frac{1}{2}$ per cent. Deposits in the Post Office banks are secured by Government guarantee; they are paid into the colonial treasury to a separate account. The Trustee banks are under Government

supervision. No new savings bank may be set up without sanction being first obtained from the Registrar of the Supreme Court. Trustee banks are required to set apart one-tenth of each year's surplus to go to the reserve fund, until the reserve fund reaches 25 per cent. of the deposits held. Trustees may, with the approval of the executive committee of the bank, lend out savings bank funds on the security of real estate. Mortgages taken may be either pledged or sold. Funds may also be invested in Government securities, and money may be advanced by way of loan on such securities. In February, 1895, the two banks between them held 358,245*l.* lent out on mortgage, 67,000*l.* invested in debentures, 156,478*l.* 5*s.* 5*d.* in cash deposits bearing interest. Their reserve funds, severally of 44,373*l.* 11*s.* 10*d.* and 17,790*l.*, amounted together to 62,163 11*s.* 10*d.* The average deposit in the Colony was 21*l.* 1*s.* 3*d.*, being equal to 4*l.* –*s.* 7*d.* per head of the population. There were nineteen depositors to 100 population.

New Zealand.

New Zealand has a Post Office savings bank with, in 1895, 357 receiving offices, and moreover seven Trustee banks of older foundation. The savings bank of Auckland has been in existence since 1847. The Post Office banks were introduced in 1865. They do by far the larger share of the business. At the close of 1895 they held 3,895,543*l.* in deposits in 137,683 accounts (in March, 1896, only 3,581,780*l.*), as compared with 725,153*l.* in 25,830 accounts in the Trustee banks. Both classes of banks have something like doubled their business within the last fourteen years. In both classes of banks the minimum limit is 1*s.*, and interest is allowed at the rate of 3½ per cent. up to 200*l.*, and at the rate of 3 per cent. beyond up to 500*l.*, at which point it ceases. The funds of the Post Office banks are paid over for investment to the Public Trust Fund. Deficiences occurring have to be made good by the Colonial Treasurer. The funds may be invested in such securities as the Governor may by order of the Council from time to time declare to be "securities in which such funds may be invested." That description (under the Act of 1892) includes mortgages, "debentures issued by any local authority under any law now or hereafter in force," rents, and profits of real estates, fixed deposits in banks of issue, and Government securities of the United Kingdom or of any colony or dependency thereof. The Post Office Department actually has a considerable amount of funds invested in Harbour Board debentures, gas bonds, River Board debentures, Borough debentures, &c., earning it from 4 to 6 per cent. interest. The cost of management is given as 7,000*l.* in the year, and 4·45*d.* for each transaction. The average amount standing to the credit of each account is 28*l.* 5*s.* 10*d.* The Trustee banks have power to lend one-third of their funds on securities of local boards of the colony secured upon the general rates, or on real estate held in fee simple. They may advance money on any lands or hereditaments in the Colony within a distance from the bank to be laid down in the

rules. They may invest in Government securities, also discount bills and promissory notes for depositors, bearing the names of at least two persons, not trustees of the bank, but in each case only up to 100*l.*, and for not more than three months, and in all the value of the bills discounted must not exceed one half of the whole deposits. Trustees are free to deal with surplus funds up to 10 per cent. in any way that they may think proper. Any excess over 10 per cent. they may pay over to any institution or institutions to be invested on their behalf in Government securities. Of the 25,830 accounts appearing on the books of the seven Trustee banks at the close of 1895, 28,815*l.*, standing for 734,888*l.* 13*s.* 10*d.*, that is, at an average of 28*l.*, was held by Europeans, and only 15, standing for 264*l.* 14*s.* 11*d.*, that is, at an average of 17*l.*, by Maoris. The Maoris deposited in the year 217*l.* 10*s.*, and withdrew 246*l.* 9*s.* 1*d.*; the Europeans deposited 444,056*l.* 8*s.* 8*d.*, and withdrew 471,560*l.* 16*s.* 4*d.* Reckoning the deposits of both classes of savings banks together we arrive at a total (at the close of 1895) of 4,620,196*l.*, at the rate of 28*l.* 5*s* 2*d.* per account, 6*l.* 12*s.* 3*d.* per head of the population, and twenty-three depositors to 100 population, exclusive of deposits in ordinary banks and in building and friendly societies.

Savings Banks in the Principal Countries of the World.

1 Country.	2 Population.	3 Description of Savings Banks.	4 Year of Return.	5 Number of Banks.
United Kingdom	38,000,000	Trustee Banks .... Post Office Banks	1895	245 11,518 11,763
France	38,000,000	Autonomous ..... Post Office.....	'95	544 7,391 7,935
Belgium	6,850,000	Government	'95	—
Netherlands	4,250,000	Free ..... Post Office.....	'94	282 —
Prussia	32,000,000	Provincial, district, free; all autonomous	'93	3,809
Bavaria.....	6,000,000	Private ..... District Banks	'94	— 400 (325 reporting)
Denmark	2,200,000	Private and Communal	'95	540 (533 reporting)
Sweden	5,000,000	Private ..... Post Office.....	'94	374 2,192 2,566
Norway.....	2,000,000	Private	'95	373
Austria.....	25,000,000	Free ..... Post Office— Savings Department ..... Banking Department.....	'94 '95	— 472 5,417 5,889
Hungary	18,000,000	Free ..... Post Office— Savings Department ..... Banking Department.....	'94 '95	595 3,982
Switzerland	3,023,382	Independent	'95	557

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	2 Population.	3 Description of Savings Banks.	4 Year of Return.	5 Number of Banks.
ITALY	31,000,000	Private Post Office	'93	395 (388 reporting) 4,679
UNITED STATES	63,000,000	Independent	'94	About 1,000
INDIA	290,000,000	Post Office	'95–96	6,343
CANADA	5,250,000	"Special" Government Post Office	'95	2 35 731
NEWFOUNDLAND	198,000 (exclusive of Labrador)	Government	'94	—
CAPE	1,600,000	Trustee Post Office	'95 '96	2 —
NATAL	550,000	Government	'95	—
NEW SOUTH WALES	1,277,870	Trustee Post Office	'95	1 499 500
QUEENSLAND	460,550	Post Office	'95	129
SOUTH AUSTRALIA	357,405	Trustee	'95	135
VICTORIA	1,181,769	"Commissioners'" (Government)... Post Office	'95	37 —
WESTERN AUSTRALIA	101,235	Post Office	'95	24
TASMANIA	160,834	Trustee Post Office	'95	2 —
NEW ZEALAND	698,706	Trustee Post Office	'95	7 357 364

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	6 Interest Allowed.	7 Limit of Deposit. Minimum.	8 Limit of Deposit. Maximum.
		Per cnt.		
United Kingdom	Trustee Banks	2½	1*s.*	50*l.* per annum 200*l.* in all
	Post Office Banks ..			
France	Autonomous	generally 3	1 fr.	1,500 frs.
	Post Office.....	2½		
Belgium	Government	3 up to 3,000 frs. 2 beyond „	1 fr.	3,000 frs.
Netherlands	Free	2½—5	—	—
	Post Office.....	2·64	25 c. (Dutch)	800 florins
Prussia	Provincial, district, free; all autonomous ...	1½—9 (generally 4—5)	generally	no limit
Bavaria	Private	—	—	—
	District Banks	mean rate 3·3	none	none
Denmark	Private and Communal	1—4½ (generally 4)	generally	none
Sweden	Private	3—6	generally	none
	Post Office.....	—	—	—
Norway	Private	2—5 generally 3½	—	—
Austria	Free	varies	none	none
	Post Office—			
	Savings Department	3	50 kreuzers	1,000 florins
	Banking Department.....	2	100 florins	—
Hungary	Free	3—16 (mostly 4—5)	generally	none
	Post Office—			
	Savings Department	3	50 kreuzers	1,000 florins
	Banking Department.....	2	100 florins	—
Switzerland	Independent	average 3½	generally	none

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	6 Interest Allowed.	7 Limit of Deposit. Minimum.	8 Limit of Deposit. Maximum.
		Per cnt.		
Italy	Private	varies	none	none
	Post Office	3	—	—
United States	Independent	varies (generally 4)	generally	none
India	Post Office	$3\frac{1}{8}$	4 annas	Rs. 2,000 (1894)
Canada	"Special" (free)	—	none	none
	Government	—	$1	$1,000
	Post Office	$3\frac{1}{2}$	$1	$1,000
Newfoundland	Government	3	—	—
Cape	Trustee	—	—	—
	Post Office	$3\frac{1}{3}$	1*s.*	600*l.*
Natal	Government	4	2*s.*	100*l.*
New South Wales	Trustee	$3\frac{1}{2}$	1*s.*	200*l.*
	Post Office	3		
Queensland	Post Office	3	1*s.*	200*l.*
South Australia	Trustee	4	1*s.*	500*l.*
Victoria	"Commissioners'" (Government)	$2\frac{1}{2}$ (2 above 100*l.*, none above 250*l.*)	1*s.*	1,000*l.*
	Post Office	3	1*s.*	—
Western Australia	Post Office	$3\frac{3}{4}$	1*s.*	600*l.*
Tasmania	Trustee / Post Office	$3\frac{1}{2}$	1*s.*	150*l.*
New Zealand	Trustee	4 (now $3\frac{1}{2}$)	1*s.*	no interest above 100*l.*
	Post Office	4 and $3\frac{1}{2}$	1*s.*	500*l.* (no interest beyond)

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	8 Description of Savings Banks.	9 Amount of Deposits in Year.	10 Amount of Withdrawals in Year.	11 Balance remaining to Depositors' Credit at Close of Year.
		£	£	£
United Kingdom	Trustee Banks	—	—	45,312,681 1,266,189*
	Post Office Banks....	32,078,660	25,698,296	4,544,332† 105,064,203 6,949,945*
		—	—	163,137,350‡
France	Autonomous	34,783,810	32,560,640	135,818,407
	Post Office.....	16,125,716	14,404,808	30,138,340
		50,909,526	46,965,448	165,956,747§
Belgium	Government	8,275,208	7,697,109	18,137,172 4,562,844*
		—	—	22,700,016
Netherlands	Free	1,534,880	1,356,400	5,602,160
	Post Office.....	1,608,240	1,246,240	3,012,532
		3,143,120	2,602,640	8,614,692
Prussia	Provincial, district, free; all autonomous	45,140,855	40,696,175	187,732,044 219,467†
		—	—	187,951,511
Bavaria.....	Private	—	—	—
	District Banks	2,857,282	2,141,760	11,527,721
Denmark	Private and Communal	17,519,328	16,749,263	33,184,105‖
Sweden	Private	4,117,732	3,815,114	18,026,832
	Post Office.....	647,722	349,721	1,607,312
		4,765,454	4,164,835	19,634,144

* Stock investments.

† Special investments.

‡ Total in Trustee Banks 51,123,202*l.*; total in Post Office Banks 112,014,148*l.*

§ The amount of savings actually held invested in stock is not given. The franc and lira are calculated throughout at 25 to the English £.

‖ The Scandinavian krone is calculated at 1*s.* 1·3*d.*

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	9 Amount of Deposits in Year.	10 Amount of Withdrawals in Year.	11 Balance remaining to Depositors' Credit at Close of Year.
		£	£	£
NORWAY	Private	5,677,012	5,227,150	12,106,781
AUSTRIA	Free	30,056,400	30,023,446	122,457,064
	Post Office—Savings Department	2,883,192	2,507,096	4,963,896*
		32,939,592	32,530,542	127,420,960
	Banking Department	118,824,712	118,740,112	4,363,352
		151,764,304	151,270,654	131,784,312
HUNGARY	Free	27,259,112	27,028,856	43,780,240
	Post Office—Savings Department	785,440	799,360	868,656
		28,014,552	27,828,216	44,648,896
	Banking Department	26,098,000	26,058,240	581,456
		54,112,552	53,886,456	45,230,352
SWITZERLAND	Independent	8,911,010	7,402,968	35,758,458
ITALY	Private	18,264,676	16,550,976	50,322,100
	Post Office	10,696,656	9,312,420	15,943,920
		43,137,108†	40,481,120†	79,023,360†
UNITED STATES	Independent	—	—	377,207,713
INDIA	Post Office (1894)	2,373,394	2,425,877	5,682,692‡
CANADA	"Special" (free)	—	—	2,625,696
	Government	648,955	793,950	3,528,991
	Post Office	1,596,383	1,462,058	5,361,108
		—	—	11,515,795
NEWFOUNDLAND	Government	151,995	201,367	564,284

* Including stock investments. † Total including other credit institutions.
‡ The rupee calculated at 1*s.* 3*d.*

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	2 Description of Savings Banks.	9 Amount of Deposits in Year.	10 Amount of Withdrawals in Year.	11 Balance remaining at Depositors' Credit at Close of Year.
		£	£	£
Cape	Trustee	78,758	53,974	163,130
	Post Office	840,790	830,395	1,535,054
		919,548	884,369	1,698,184
Natal	Government	108,462	91,558	172,304
New South Wales	Trustee	1,748,224	1,519,879	3,951,875
	Post Office	2,194,134	1,835,000	4,121,700
		3,942,358	3,354,879	8,073,575
Queensland	Post Office	1,234,535	1,112,082	2,286,810
South Australia	Trustee	1,417,533	1,280,042	2,691,273
Victoria	"Commissioners'" (Government)	2,888,383	2,743,965	4,188,001
	Post Office	1,610,865	1,569,266	3,128,128
		4,499,248	4,313,231	7,316,129
Western Australia	Post Office	146,388	83,500	460,610
Tasmania	Trustee	292,984	270,067	533,089
	Post Office	78,717	62,785	114,994
		371,701	332,852	648,083
New Zealand	Trustee	444,274	471,807	725,153
	Post Office	2,794,507	2,369,333	3,895,543
		3,238,781	2,841,140	4,620,696

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	12 Number of Accounts.	13 Average Amount of each Account.	14 Management Expenses.
			£ s. d.	£
United Kingdom	Trustee Banks	1,516,229	29 17 10	134,568
	Post Office Banks	6,453,597	15 3 4	414,625
		7,969,826	20 9 4*	549,193
France	Autonomous	6,498,556	21 – –	260,644
	Post Office	2,488,075	12 – –	137,164
		8,986,631	18 – –	397,808
Belgium	Government	1,145,408	15 16 10	36,023
Netherlands	Free	338,978	16 11 2	15,600
	Post Office	401,046	7 10 2	14,080
		740,024	11 12 9	29,680
Prussia	Provincial, district, free; all autonomous	6,255,507	30 – –	349,243
Bavaria	Private	—	—	—
	District Banks	665,943	17 6 –	about 23,500
Denmark	Private and Communal	999,854	32 18 –	—
Sweden	Private	1,093,521	16 10 –	115,007
	Post Office	367,337	4 7 6	6,225
		1,460,858	13 5 –	121,232
Norway	Private	540,053	23 3 4	70,491
Austria	Free	2,786,448	42 16 –	—
	Post Office—Savings Department	1,110,091	3 3 9	27,552
		3,896,539	32 12 10	—
	Banking Department	28,363†	153 16 10	80,888
		3,924,903	33 11 6	—
Hungary	Free	715,064	61 4 6	—
	Post Office—Savings Department	276,565	3 2 5	—
		991,629	45 – –	—
	Banking Department	3,767	154 – –	—
		995,386	45 8 9	—

* Inclusive of stock investments and special investments; otherwise 19*l.* 2*s.* 3*d.*
† 543 foreign accounts.

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	12 Number of Accounts.	13 Average Amount of each Account.	14 Management Expenses.
			£ s. d.	£
Switzerland	Independent	1,196,590	29 17 7	—
Italy	Private	1,475,000	34 2 6	538,416*
	Post Office	2,622,908	6 1 6	—
		4,582,991†	17 4 10†	—
United States	Independent	4,875,519	77 7 4	—
India	Post Office	653,892	8 15 –	—
Canada	"Special" (free)	—	—	—
	Government	54,932	64 4 –	—
	Post Office	120,628	44 5 4	—
Newfoundland	Government	6,401	88 2 –	—
Cape	Trustee	6,489	25 2 9	—
	Post Office	43,672	35 – –	—
		50,161	28 – 9	—
Natal	Government	6,963	24 15 4	—
New South Wales	Trustee	71,099	55 11 7	—
	Post Office	131,703	31 5 10	—
		202,802	39 16 2	—
Queensland	Post Office	56,421	40 10 7	—
South Australia	Trustee	86,734	31 – 7	—
Victoria	"Commissioners'" (Government)	212,597	19 12 10	—
	Post Office	125,883	24 16 11	—
		338,480	21 12 4	—
Western Australia	Post Office	16,160	28 10 1	—
Tasmania	Trustee	23,984	22 4 5	—
	Post Office	6,785	17 – –	—
		30,769	21 1 3	—
New Zealand	Trustee	25,830	27 6 –	—
	Post Office	137,683	28 5 10	—
		163,513	28 5 2	—

* 239,568*l.* being taxes. † Including all deposit institutions.

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	15 Cost per Transaction.	16 Rate per Cent. of Expenses of Management to Total Amount of Deposits.	17 Reserve Fund.
		d.	Per 100*l.*	£
United Kingdom	Trustee Banks	8·3	6*s.*	351,493*
	Post Office Banks	6·4	8*s.* 5½*d.*	—
France	Autonomous	—	—	992,976 (+ 3,243,488 capital)
	Post Office	8·3	9*s.* 4½*d.*	234,708
Belgium	Government	—	—	1,227,687
		—	4*s.*	413,464
Netherlands	Free	—	5*s.* 7*d.*	824,960
	Post Office	—	9*s.* 4*d.*	2,745
Prussia	Provincial, district, free; all autonomous	—	7*s.*	827,705
		—	3*s.* 9*d.*	13,250,401
Bavaria	Private	—	—	—
	District Banks	—	4*s.*	990,000
Denmark	Private and Communal	—	—	1,545,935
Sweden	Private	—	—	1,598,489
	Post Office	3	5*s.*	—
Norway	Private	—	11*s.* 7*d.*	1,690,156
Austria	Free	—	—	12,487,670
	Post Office—Savings Department	2	11*s.* 1*d.*	169,606
		—	—	12,657,276
	Banking Department	—	3*s.* 7*d.*	222,336
Hungary		—	—	12,879,612
	Free	—	—	3,996,650
	Post Office—Savings Department	—	—	24,260
	Banking Department	—	—	
				4,020,910

* Surplus fund.

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	15 Cost per Transaction.	16 Rate per Cent. of Expenses of Management to Total Amount of Deposits.	17 Reserve Fund.
			Per 100*l.*	
Switzerland	Independent	—	—	—
Italy	Private	—	—	5,822,610
	Post Office	—	—	—
			18*s.* 9*d.*	
United States	Independent	—	—	—
India	Post Office	—	—	—
Canada	"Special" (free)	—	—	—
	Government	—	—	—
	Post Office	—	—	—
Newfoundland	Government	—	—	22,930
Cape	Trustee	—	—	—
	Post Office	—	—	—
Natal	Government	—	—	—
New South Wales	Trustee	—	—	238,268
	Post Office	—	—	5,241
		—	—	243,509
Queensland	Post Office	—	—	—
South Australia	Trustee	—	—	75,000
Victoria	"Commissioners'" (Government)	—	—	2,058
	Post Office	—	—	—
Western Australia	Post Office	—	—	—
Tasmania	Trustee	—	—	—
	Post Office	—	—	—
New Zealand	Trustee	—	—	—
	Post Office	—	—	—

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	18 Deposit Account per Inhabitant.	19 Number of Accounts to 1,000 of the Population.	20 Mode of Investment.
		£ s. d.		
United Kingdom	Trustee Banks	1 4 6	40	Government securities only
	Post Office Banks	2 19 –	169	
		4 3 6	209	
France	Autonomous	3 10 10	170	Mainly government securities. A portion in local municipal stock, mortgage bonds, working-men's dwellings, and loans to various bodies judged "of public utility"
	Post Office	– 16 8	65	
		4 7 6	234	
Belgium	Government	2 13 –	180	Government securities, municipal, railway, and corporation bonds, bills of exchange, and other personal security
		(3 6 3)*		
Netherlands	Free	1 5 2	70	Public and private securities, bills of exchange, mortgages, &c., at discretion
	Post Office	– 15 4	94	
		2 – 6	164	
Prussia	Provincial, district, free; all autonomous	5 17 4	196	Every variety of security, public, real, or personal
Bavaria	Private	—	—	Every variety of security, public, real, or personal
	District Banks	2 – 2	111	
Denmark	Private and Communal	15 – –	454	Every variety of security, public, real, or personal
Sweden	Private	3 11 4	218	Public securities, corporation stock, mortgages, &c.
	Post Office	– 6 8½	73	
		3 18 –	291	
Norway	Private	6 2 –	262	Mortgages, private securities. 10 per cent. must be "readily realisable"

* Including stock investment.

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	18 Deposit Account per Inhabitant.	19 Number of Accounts to 1,000 of the Population.	20 Mode of Investment.
		£ *s.* *d.*		
Austria	Free	4 18 –	113	
	Post Office—Savings Department	– 4 –	44	Public and private securities, mortgages, loans, bills of exchange, &c.
		5 2 –	157	
	Banking Department	– 3 6	1	
		5 5 6	158	
Hungary	Free	2 8 7	40	Public and private securities, mortgages, loans, bills of exchange, &c.
	Post Office—Savings Department	– – 7	15	
	Banking Department	2 9 2	55	
		– – 7	0·2	
		2 9 9	55·2	At the bank's discretion
Switzerland	Independent	11 16 8	396	" "
Italy	Private	1 12 6	47	
	Post Office	– 10 4	86	
		2 16 6*	148*	
United States	Independent	6 – –	77	Public securities, mortgages, municipal and county securities, or bank deposits
India	Post Office	—	—	Government cash balances
Canada	"Special" (free)	– 10 –	—	20 per cent. in Dominion securities. The rest absolutely at pleasure
	Government	– 13 5	10½	Handed over to the Treasury
	Post Office	1 – 5	23	" "
		2 3 10	—	
Newfoundland	Government	2 17 –	32	Real, personal, and government securities

* In all deposit institutions.

Savings Banks in the Principal Countries of the World—Contd.

1 Country.	3 Description of Savings Banks.	18 Deposit Account per Inhabitant.	19 Number of Accounts to 1,000 of the Population.	20 Mode of Investment.
		£ *s.* *d.*		
Cape	Trustee	– 2 –	4	"Such colonial securities as the banks think fit"
	Post Office	– 19 2½	27	Savings banks certificates Securities of the colony accounted for at purchase price
		1 1 2½	31	
Natal	Government	– 2 10	4	Securities of any colony or dependency of the United Kingdom
New South Wales	Trustee	3 1 10	55½	Mortgages, government, municipal securities
	Post Office	3 4 6	103	Government securities held to savings bank account
		6 6 4	159	
Queensland	Post Office	4 19 4	122	Government debentures, fixed deposits, current accounts
South Australia	Trustee	7 10 7	242	Mortgages, government securities, bank deposits, municipal debentures
Victoria	"Commissioners'" (Government)	3 10 10	189	Mortgages, corporation stock, loans to farmers
	Post Office	2 13 –	106	Government securities
		6 3 10	295	
Western Australia	Post Office	4 11 –	159	Government and municipal securities
Tasmania	Trustee	3 6 3	149	Government securities, mortgages, loans on securities
	Post Office	– 14 4	40	Government securities
		4 – 7	189	
New Zealand	Trustee	1 – 9	36	Loans to local boards, mortgages, bills of exchange, &c.
	Post Office	5 11 6	197	Such securities as the Governor in Council may direct
		6 12 3	233	

Discussion *on* Mr. H. W. Wolff's Paper.

The President said that Mr. Wolff had given them a most excellent paper, which, though not thoroughly statistical, contained a great deal of information from foreign and colonial sources which could not be got at without considerable research. He should not himself attempt to take any part in the discussion, as it involved criticism of government action in several particulars, but would merely suggest that the chief points raised in the paper, and which he hoped would be thoroughly discussed, were as to the function of the State; whether the State should interfere at all, and if so how far, in collecting deposits, or whether it should relegate what was done at present to municipal authorities. A second point which was well brought out in the paper was whether a limit to savings should be fixed either in the interest of the bankers or of the community. The third point was what investments should be allowed besides government securities? Mr. Wolff did not allude to one rather important point in connection with the savings banks figures. With regard to these figures as showing what the real savings of the country were, we should remember that there was a great deal of money which had been transferred into the savings banks either from capital invested in business or other capital belonging to persons of some wealth. On the other hand there was an immense lot of saving which did not appear in the figures, but went into the general industries and trading fund of the country. Another point he had not raised was this: was it right to encourage thrift in every possible way? could people be too thrifty? Some said the working man might begin by saving his tobacco and beer; he might then proceed to save his children's luxuries, and perhaps some of their necessaries, and then might possibly be inclined to do without the children themselves, and so cause a stationary but economically efficient population such as was seen in some countries of Europe at the present time.

Mr. A. H. Bailey thought that this subject was one of general interest, especially at the present time. It was tolerably clear that there must be in the near future some further legislation in this country in reference to savings banks, remembering the fact, which he did not think was generally known, that 28½ per cent. of the whole consol stock was composed of savings banks deposits, and that those were increasing every year by 11 million £; that the price of consols was steadily going up, and that therefore it was quite impracticable to maintain the present rate of interest of 2½ per cent. Among other general questions raised Mr. Wolff wanted to get rid of State control; but he would go further, and would maintain that it was no part of the function of the govern-

ment to undertake banking business at all. It should be left to private enterprise, when it would be done much better. Of course it was quite necessary that certain regulations should be imposed on savings banks conducted by private enterprise; there must be a sufficient amount of capital, and it would be necessary to allow the deposits of children, as was done in the Post Office savings banks. It was not generally known to how large an extent these deposits were those of the children of the upper and middle classes. He was himself of opinion that there should be no restriction about investments, and it was very doubtful whether there should be any limits as to deposits. Savings banks should be undertaken for business purposes to make a profit, and the rate of interest must fluctuate with the state of the market; the difference between the interest they could earn and the interest they paid providing for the working expenses and profit. In that way the depositors would do better and the public also. Mr. Wolff had pointed out that we were paying off the national debt at the rate of 8 million £ a year. A good deal of this was incurred in 1818, when the price was 80, and we were now paying it off at 112, with a possibility of the price increasing every year. It was therefore desirable on general principles that the government should not undertake banking business, and he thought Post Office savings banks should be abolished, and private institutions take their place.

Mr. Nathaniel Cohen said that this paper was full of suggestive thought, and most opportune. He thought economists and publicists at last recognised that there was urgent need for a review and extension of the financial arrangements of the savings banks. He might be permitted to recall that so long as seven years ago he called attention to the necessity of such a review when putting forward his proposal for automatically accumulative consols, a plan which had been adopted by the government and by the borough of Liverpool, and which had also lately been copied by the London County Council. It was interesting to note that as many as about 6,000 accounts had made use of that facility. But so long as anybody could obtain for each pound deposited the return at any time of 1*l.* with 2½ per cent. interest, and also so long as a stamp of 10*s.* was imposed by the Treasury on transfers by power of attorney of consols when the amount exceeded 100*l.*, it was most unlikely that many people would take on themselves all the risks of fluctuation in their capital and receive a lower rate of interest. Therefore he was not surprised to find that whilst in the first three years the rate of increase in the number of accounts on this accumulative principle was at the rate of about an average of 1,000 a year, during the last two or three years the average rate of increase had been only about 200. But of course if even the stamps to which he had alluded were removed or reduced, this system was never likely to attain a scale that would materially relieve the situation disclosed in the paper. There was probably no difference of opinion as to the educational value of popular facilities for saving. The main question was to what extent and especially for what classes were they entitled to ask from the general body of

taxpayers of the country a subvention in cash or in kind, that is to say, in the way of insurance against risks of fluctuation in capital, and to stimulate saving by supplementing the yield of consols. Probably there would be no difference of opinion also that in the happy absence of a large European war accumulation was likely to very far outbalance consumption and wastage. Therefore it was unlikely that in the long run the difference would grow smaller between the present rate of the Post Office banks, plus the cost of administration, and the rate yielded on consols. The main debateable question was whether they could by different expedients go on until 1903, when the rate of consols would be reduced to $2\frac{1}{2}$ per cent., and when undoubtedly the rate of interest in the Post Office savings bank would have to be reduced if the present arrangements continued. He quite agreed with Mr. Wolff that as a temporary expedient some new channel for a proportion of the fresh deposits ought to be authorised. But he would venture to submit that it was quite illusory to fancy that by an extension of the scope of investments so as to include existing choice securities not guaranteed by national credit they would practically relieve the situation. He was referring to the suggestion in the paper with regard to investments in municipal, colonial, and other securities. What did that suggestion imply? That if you would invest the Post Office deposits into these choice securities, if you would regard as nil the risk of fluctuation in value of such securities by migration of the population, or by strikes, &c., and especially the risks of unmarketability, risks which the present investor valued at from $\frac{1}{8}$ per cent. to $\frac{3}{8}$ per cent. per annum, then it was implied that you could continue to pay $2\frac{1}{2}$ per cent. on Post Office deposits. He should like to remark on this suggestion, that in any case the principle should be maintained that for the investment of Post Office deposits no securities were suitable of which the control and the issue were not subject to the British Parliament or a department responsible to the British Parliament. Of course to some extent the loss on fresh deposits was recouped by the profits on the old deposits invested when the level of prices of consols was lower. Similarly he thought with Mr. Wolff that they might now safely invest a proportion of fresh deposits in unmarketable securities, as they had such a large sum already invested in consols. But he submitted that if they really wanted to gain advantages on anything like the scale implied in the paper, they must face a degree of unmarketability very much larger than that which was indicated in the paper, and certainly go outside the range of securities quoted and dealt in on the Stock Exchange. He believed if the extension of the scope of investment suggested in the paper were authoritatively foreshadowed, much less sought to be carried out in practice, then the price of the existing securities proposed for investment would very soon rise nearly, if not quite, to a level which would quickly annul the small extra interest now obtainable.

But the new channel for investment to which he ventured to think a proportion of new deposits of savings banks might be

beneficially directed was already marked out by Parliament. He was interested to gather from the paper that the channel to which he desired to refer was already authorised in Belgium, and to a certain extent also in France. He would like to see the channel in question made more navigable by greater facilities and greater safeguards. He referred to the cheaper, better, and easier housing of the wage-earning working classes. He believed if as a preliminary step there were added to the existing Acts referring to the housing of the working classes certain safeguards, securities, and facilities, and if there were also a proper provision for a surrender value and against undue competition with such vested interests as it might be right to consider, then the rural, provincial, and smaller urban districts might absorb a sufficient proportion of fresh deposits to enable the present rate of $2\frac{1}{2}$ per cent. to be continued without unreasonable loss until 1903. It was in that direction that he would urge attention should in the first instance be given rather than to proposals to reduce the rate at once, with the prospect of a further reduction in 1903. Since the last Commission on the unemployed, he had not much confidence in the satisfactory solution of economic questions involving sociological issues by a group of busy members of Parliament, who were often hampered by electoral affinities. He would like to see the question investigated by a committee drawn from the permanent officers of the Treasury, of the Statistical Department of the Board of Trade, and especially of the Local Government Board. It was in that way he should think a solution would be more speedily and satisfactorily reached, than by a platitudinarian exposition of the well-known salient points of the position by a Select Committee of the House of Commons.

Mr. Frank Dethridge wished, as a former Member of the Society, to express the pleasure Mr. Wolff's paper had afforded him. He fully endorsed some of the observations of the last speaker, and would suggest that a good channel of relief would be to get Parliamentary powers giving the trustees of savings banks the option of loaning their money to local, municipal, and urban authorities throughout England. Local authorities had been in the habit of borrowing money at from $3\frac{1}{2}$ to 5 per cent. He knew of an instance of 48,000*l.* being borrowed at 4*l.* 9*s.* per cent. If an amending Act could be obtained and powers given to savings banks to make loans to local authorities, it would benefit all concerned. He hoped that strong efforts would be made in this direction, and if some resolution were framed by the Society to that effect, he had no doubt it would receive general approbation. Borrowing at a lower rate than at present would give sanitary authorities a chance to clear away slum areas and promote health and contentment. The more thrift was encouraged the more the poor rate would be diminished. Should the law be altered, local authorities would be able to borrow at $2\frac{3}{4}$, or even at a lower rate.

Mr. John Dun wished to lay before the meeting the point of view of the ordinary banker, which had been entirely disregarded

in this very able paper. The question of the encouragement of thrift was of course a very important one, but the real question was whose thrift were they to encourage? Were they to encourage the thrift of all classes, from the highest to the lowest? Savings banks were originally intended to encourage thrift amongst the poor, hence those limits which appeared to Mr. Wolff so inconvenient and objectionable, but which he himself looked upon as most proper, but if anything, too high. When one came to make an analysis, which Mr. Wolff had refrained from doing, as to how the deposits in the savings banks were held, one would find that in sums not exceeding 50*l.* each the deposits amounted to a total of 35,300,000*l.*, held by no fewer than 5,858,191 persons, showing an average of about 6*l.* per head. Deposits above 50*l.* and under 100*l.* made a total of as nearly as possible 24 million £; but then the number of depositors holding those sums was very remarkably fewer than those holding the smaller amounts, being only 346,463. Going to sums between 100*l.* and 200*l.* there were deposits amounting to 38,595,000*l.*, but these were held by only 248,943 persons. It thus appeared that only 9 per cent. of the total number of depositors in the Post Office savings banks have deposits exceeding 50*l.* each. As had been well argued by Mr. George Rae in a letter recently published in the "Economist," over the signature of Senex, he held that if the rate of interest on the larger sums were diminished, it would be practically no discouragement to thrift in the classes for which savings banks were intended, and to which, according to his view, they ought to be confined, but the money which would otherwise go into these savings banks, amounting altogether, taking sums above 100*l.*, to nearly 40 million £, and taking sums above 50*l.*, to another 24 million £, would be left to go elsewhere, and some of it would come into the hands of the ordinary bankers. The advantage of this would be that whereas the Government, through the various post offices, merely collected the money and purchased consols with it, the ordinary banks having collected the money would lend it out again in the district, so that the savings of that district would be more fully employed in fostering the trade and agriculture of the district. He held very strongly that it would be necessary to reduce the rate of interest on the larger sums, and he thought the figures he had adduced showed that that could be done without any material diminution of encouragement to thrift in the direction in which they desired it to be specially encouraged. He thought that the extension of the scope for investments was a matter which deserved great consideration, and some practical scheme ought ultimately to be devised. He would suggest that if a commission or a committee were appointed to consider this question, some members of the banking profession might with advantage be admitted as members of it.

Mr. L. Tatham said he had had some experience in connection with trustee banks, being the chairman of the committee of management of the largest one in England. Their committee found themselves greatly obstructed by the government in their special investment department, as they could not now lend money

to any corporation or public body. All the money sent up to the government by trustee banks was not in consols. The return just issued from the National Debt Office showed that only 22 million £ out of 47 million £ was in consols; the rest was invested in various annuities and loans to other government departments. One large item of 7,615,175*l.* was entered in the official return of the Comptroller General, "the cash value of consols estimated to have been unreplaced on the 29th November, 1896." He was quite unable to explain the investment, but it was one of the government investments representing part of the 47 million £. Under the Act of 1863 the trustees had powers to take money for special or "supplementary" investments, and when a depositor's account in the ordinary department got near to the statutory limit, they asked the depositor to place some in this special investment department, and lent it to the corporations of Manchester and Salford for a short term of years, but subject to three months' notice if the money was required for repayment of depositors. The depositors were required to give three months' notice, so the money was always available when required. They had never had to recall any loan before maturity. The Act of 1891 restricted the investment power of the trustees in this special investment department to those allowed to ordinary trustees—so now they could not *lend* money to the corporations, although they might buy corporation stock. It had been represented to the Chancellor of the Exchequer that a loan on a bond of a large corporation was a better security and more suitable for the purposes of these special investment departments than stock, but he declined to facilitate any change of the law. The National Debt Office said it was now illegal, and any money so lent after the Act of 1891 must be recalled. Most savings banks with special investment departments had to recall considerable sums, and all had suffered loss and inconvenience. That was one of the ways in which trustee banks were not assisted by the government. It was said that they ought to lend the money to assist in building houses for the labouring poor, but the Act of Parliament of 1891 absolutely forbade it, and declared that no investments could be made on mortgages of land or any interest in it. A previous speaker referred to accounts of 200*l.* and over, which he thought ought to be taken out of savings banks and invested by the depositor or handed over to the ordinary bankers; but he could hardly have been aware of the long time many of those accounts had taken to reach the statutory limit, and that the people who had saved 5*l.* or 10*l.* a year had, when old, no experience in investing, and would have had great difficulty in finding out how to dispose of their money. The increase in the limit of deposits had made very little difference in the accounts at Manchester. Before the limit was increased 82 per cent. of the accounts were under 50*l.*, and since then 80 per cent.

Mr. W. F. B. Eyre said that the main points brought forward requiring careful consideration were, first, whether the limit of deposits should be restricted; and second, whether there should

be a reduction in the present rate of interest. With regard to the latter point the representatives of the trustee savings banks said that the interest ought not to be further reduced; and with regard to the former, they held that the limit of deposits was quite low enough. Much might be said upon these points, but he held that every inducement should be given to save. It should not be forgotten that trustee savings banks were the pioneers of thrift in this country. They had been established since 1818, and, as Mr. Wolff had told them, in the early part of their career they were practically subsidised by the government in order that they might pay a high rate of interest to poor people and encourage them to become thrifty. The movement had grown beyond every expectation. Taking his own town, Hull, as an illustration, out of a population of 200,000 they had in their bank over 54,000 depositors, and, irrespective of that, they had encouraged thrift in the minds of the young by the establishment of penny banks in Board schools, Sunday schools, &c. There were now nearly 200 of these in operation in Hull, and Mr. Tatham, in Manchester, had an even greater number. The rising generation were thus being educated in habits of thrift, and good results must follow. It had been urged that the large deposits in savings banks should carry less interest than the smaller amounts. This, however, would be a great injustice, for in the very large majority of cases the large deposits were the accumulated savings of a lifetime, and the question might reasonably be asked if a man should be taxed because he was thrifty. Savings bank depositors did not understand ordinary commercial banking business, and they could not be expected to transfer their money in that direction; they knew very little about the management or investment of money outside their savings bank. The solution of the present difficulty was to be found in an enlargement of the powers of investing the funds of savings banks. The present powers were too limited. The trustee banks and the Post Office savings banks could work easily side by side, and could do considerable good. In Scotland, in the North, in Hull, Manchester, and the Midlands, where the larger trustee banks predominated, they gave facilities for the transaction of business not granted by the Post Office banks; hence their enormous success. The great preponderance of deposits was in small amounts—it was a mistake to think otherwise. The government allowed $2\frac{3}{4}$ per cent. to trustees for all moneys invested; out of this they could not pay more than $2\frac{1}{2}$ per cent. to depositors; the other $\frac{1}{4}$ per cent. went towards providing buildings, working, and staff. It was on the accumulated savings, not on the small amounts, that the profits were obtained, and to take from the banks the large deposits would mean a great loss, for the small accounts did not pay. The sooner these questions of limit and area of investment were dealt with the better, and it would be a sad day if anything were done which would interfere with thrift. England owed her greatness to the thriftiness of her people, and the cause should therefore be encouraged to the utmost in the interests of the nation.

Mr. E. W. Brabrook said that when he was writing the article "Savings Banks" for the "Encyclopedia Britannica" some years ago, he took pains to get as much information as he could about foreign savings banks, and he was much struck on comparing the figures he then obtained with those given by Mr. Wolff in this paper, to find that in hardly any case did they fall short of doubling the amount of deposits in savings banks in any foreign State during the twenty years' interval, and in some cases they had increased six or eight or nine fold. He could not quite follow Mr. Wolff in his high appreciation of savings banks. He looked on them merely as infantile efforts in thrift. He regarded a person who deposited his money in a savings bank, so that it should be kept safe for him by some one else, as very much less worthy of encouragement than a person who used his savings in some way in co-operation with other people for his benefit and for the benefit of others. He therefore did not look on the progress of savings banks with unalloyed satisfaction, but only as one step on the way to self-help. Here they had two or three different classes of savings banks to deal with. There were the Post Office savings banks. He agreed with Mr. Wolff that no one wanted to abolish them. The fact was that if savings banks were to be collected and invited on the condition of repayment or demand, and subject to the condition of absolute safety, and if that was done in such a method that there was no subsidy and no grant out of public funds to support it, then the agency of the State was the most convenient of any for the purpose. Similarly no one would now start a fresh system of trustee banks, because they were unsuited to present requirements. The system had been started purely as a charity, and they had been conducted on that principle. They had done immense good and were a great success, but that kind of free management could not altogether be depended on for going into the money market and buying and selling, and although he entirely agreed with what Mr. Wolff had quoted from some evidence of his own, that there had been no loss so far as he was aware on the special investment branches of savings banks, yet that was because those special investment branches had been very limited in their operation. Had they been carried on, as in one particular bank they had been, to the exclusion of every other kind of business, it would not be possible to say so much for the special investment branch. He had been struck by one fact in the Report of the Inspection Committee of the Trustee Savings Banks, which he ought to mention was not a government body, although he had the honour of appointing one person to a seat upon it. It was a body consisting largely of representatives of savings banks and others engaged in their management and control. Comparing the first year of the operation of that inspection committee with last year, he found that in the first year ending 20th November, 1892, 167 savings banks were reported upon by the inspectors, and showed 608 instances of neglect of statutory requirements, thus showing how very greatly under free management neglect would extend if there was no supervision. For the year ending 20th November, 1896, the total number of trustee savings banks was 245, all of

which were reported upon by the inspectors, and only 219 instances of neglect of statutory requirements were found, which proved the value and importance of inspection and control over these banks. One of Mr. Wolff's remedies was that there should be greater freedom of organisation of savings banks generally. But they had perfect freedom already. The Yorkshire Penny Bank was an entirely voluntary institution, which was doing a great deal of good. Then there was the National Penny Bank; he did not quite know what its organisation was, but he imagined it was a valuable institution, and it was entirely voluntary, and in fact was on the American system. But the experience of the American savings banks was not so encouraging as to induce them to give up the government system, because he found that rather more than 1 per cent. of the American savings banks went into liquidation each year, and although he fully admitted that the return of the liquidations was not so unfavourable as in the case of the other banks, still it was sufficiently so to make one hesitate before suggesting anything which would largely alter the existing state of things in this country.

Mr. Wolff, in reply, said that the short amount of time left precluded him from entering at any length into the points which had been raised. Several speakers had very rightly remarked that he had left more than one point of some importance untouched upon. He had been obliged to do so from want of time. The Chairman had referred to there not being many statistics in his paper. He had put plenty of statistics into the tables, which he hoped that the Society would print as an appendix. The figures there given were valuable, being all taken from official sources. Mr. Dun had raised some objections, which naturally presented themselves, as a banker. Well, he must own that he had not approached the question from a banker's point of view, but as thinking of the 8 millions of depositors, and more who might become such. At the same time he did not wish to injure the bankers; but he thought they were scarcely right in regarding savings banks as rivals and enemies. He looked on them rather as trainers and teachers for the commercial banker. With regard to the large deposits, of which complaint was sometimes made as not representing *bonâ fide* saving, in the bank of which he was at one time manager he had asked the actuary to go through the list of persons who had between 100*l.* and 200*l.* accumulated. In almost every instance he found that the depositors were *bonâ fide* working men, and that the balances represented the economies of a lifetime up to sixty years. This money would not in any case have gone to commercial banks. In support of what Mr. Eyre and others had said, he affirmed that even in southern England there was a great deal of saving done through trustee banks which could not be done through the Post Office banks. Among other things, the Post Office did not give advice. There was one very important point upon which Mr. Cohen had touched, that of employing savings banks money for the building of working men's dwellings. There was a great deal of that being done in France,

and a great deal more was going to be done under the new Act. A great deal was also done in Italy and in Belgium. M. Rostand, the President of the Savings Bank of Marseilles, was very active in that respect. If they would look at the doings of the Artisans' Dwellings Company, which housed hundreds of thousands of people, they would find that that company paid their shareholders 4 or $4\frac{1}{2}$ per cent. Here was money coming in all over the country to the savings banks at the price of $2\frac{1}{2}$ per cent. and at the rate of 11 million £ a year, which might be increased to 20 or 30 million £, ready to be employed in the same way. That was a point upon which his friend M. Luzzatti, in his savings banks legislation, laid particular stress. He had, among other things, insisted that the savings banks surpluses accruing should be reserved for some public use benefiting the poorer population. Answering Mr. Brabrook, Mr. Wolff said that like that gentleman he was not in favour of savings banks as an institution *per se*, but looked on them as schoolmasters leading people up to better things. Mr. Brabrook was well aware that he was very much in favour of people's banks, and so to speak self-help savings banks, which he looked upon as much better things, because what could be done by self administration was infinitely better than what was done by the State. He sincerely hoped that the discussion, which had been very interesting, would do something towards bringing this question, which an ex-Cabinet Minister had told him certainly called for a fresh inquiry by a Parliamentary Committee, to a satisfactory solution.

The Movements *for the* Inclosure *and* Preservation *of* Open Lands. *By* Sir Robert Hunter.

[Read before the Royal Statistical Society, 25th May, 1897.
The President, A. E. Bateman, Esq., C.M.G., in the Chair.]

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I.—*Common Fields and Commons.*

I need not tell an audience such as I am addressing this afternoon that in the early days of our history the land of England lay open and unfenced, the network of hedges which is now typical of the English landscape being in the main a very modern creation. Long after England was a settled country—in Saxon, Norman, Plantagenet, Tudor times—the country was for the most part tilled on the common-field system, and, with the exception of a few paddocks and homesteads, was uninclosed, or inclosed only during a portion of the year, and with mere temporary barriers. When the crops were carried, all fences were removed, and the land was thrown open to the cattle of the community. It is perhaps unnecessary to quote authority for this general statement. Mr. Seebohm's ingenious and graphic dissertation on the "English Village Community" starts from the fact of the cultivation in common of the fields of the vill. Previous writers had emphasised the same fact, while deducing from it very different conclusions as to the status of the community. And the latest writer on the vexed subject of the early settlement of the country, Mr. Maitland, in his careful and patient examination of Domesday Book, equally recognises as beyond question, that the greater part of England was during the Middle Ages divided into vills or towns, each standing in the midst "of its fields, its territory, a considerable part of which "will probably have consisted of spacious common fields."[1]

[1] Maitland, "Domesday Book and Beyond," 15.

Mr. Maitland, however, points out that it must not be immediately concluded, that the whole of England was at the time of the Norman Conquest settled and cultivated after one and the same fashion. He draws attention to localities which, to use his language, are lands of hamlets rather than of villages, where the houses of a parish lie in several small clusters, often with names of their own, distinct from that of the parish, where there are no traces of very large fields, and where, on the face of the map, there is no reason why a particular group of cottages should be reckoned as belonging to one parish rather than to its neighbour. Mr. Maitland finds the latter type of parish more frequent as one travels westwards, and completely in possession in Wales and Cornwall; and he suggests, that it indicates a Celtic rather than a Germanic settlement. But the land of hamlets was probably as free from permanent inclosure at the time of the Conquest as the land of villages; for the west appears to have been more thinly populated than the east, its land was worth less, and there were fewer teams to till it. And the tillage appears to have had no regard, as the common-field system had, to the regular rotation of crops, but to have consisted in the conversion of the land from grass to arable and from arable to grass time after time,—wheat, barley, and oats being sown as long as the land would bear any, and then grass for eight or ten years, until the land was recovered and capable again of bearing corn.[2] Such a system, which brought all the lands of the community under tillage as they were required, and then restored them to waste when exhausted, would certainly not involve permanent hedges or exclusive proprietorship.

To return however to the English village and its common fields, I will quote by way of description not one of the authors to whom I have referred, and who (it might be suggested) have theories in view as to the status of the village community which might colour their pictures, but a purely agricultural writer of the early part of the century. William Marshall, in his "Elementary "and Practical Treatise on Landed Property,"[3] writes thus:—

"A very few centuries ago nearly the whole of the lands of "England lay in an open, and more or less in a commonable state. "Each parish or township was considered as one common farm, "though the tenantry were numerous.

"Round the village in which the tenants resided lay a few small "inclosures, or grass yards, for rearing calves, and as baiting and "nursery grounds for other farm stock. This was the common "farmstead, or homestall, which was generally placed as near the

[2] Maitland, p. 25, quoting Marshall's "Review of Reports of Agriculture," p. 73.

[3] Marshall's "Elementary and Practical Treatise on Landed Property." London, 1804.

" centre of the more culturable lands of the parish or township as " water and shelter would permit.

" Round the homestall lay a suit of arable fields, including the " deepest and soundest of the lower grounds, situated out of water's " way, for raising corn and pulse, as well as to produce fodder and " litter for cattle and horses in the winter season.

" And, in the lowest situation, as in the water-formed base of a " rivered valley or in swampy dips, shooting up among the arable " lands, lay an extent of meadow grounds or '*ings*,' to afford a " supply of hay for cows and working stock in the winter and " spring months.

" On the outskirts of the arable lands, where the soil is adapted " to the pasturage of cattle, or on the springy slope of hills, less " adapted to cultivation, or on the fenny bases of valleys, which " were too wet, or gravelly water-formed lands, which were too dry, " to produce an annual supply of hay with sufficient certainty, one " or more stinted pastures, or hams, were laid out for milking cows, " working cattle, or other stock which required superior pasturage " in summer.

" While the bleakest, worst-soiled and most distant lands of the " township were left in their native wild state for timber and fuel, " and for a common pasture, or suit of pastures, for the more " ordinary stock of the township, whether horses, rearing cattle, " sheep, or swine, without any other stint or restriction than what " the arable and meadow lands indirectly gave; every joint-tenant, " or occupier of the township, having the nominal privilege of " keeping as much live stock on these common pastures in summer " as the appropriated lands he occupied would maintain in winter.

" The appropriated lands of each township were laid out with " equal good sense and propriety. That each occupier might have " his proportionate share of lands of different qualities, and lying " in different situations, the arable lands more particularly were " divided into numerous parcels, of sizes, doubtless, according to " the size of the given township and the number and ranks of " the occupiers.

" And, that the whole might be subjected to the same plan of " management, and be conducted as one common farm, the arable " lands were moreover divided into compartments or 'fields,' of " nearly equal size, and generally three in number, to receive in " constant rotation the triennial succession of fallow, wheat (or " rye) and spring crops (as barley, oats, beans and peas)."

Add to this description the undoubted fact, that from the time when the crops were carried till the next sowing, each arable field was thrown open to be depastured in common by the cattle of the community, and that the fallow field was open to the run of the cattle throughout the year, and you will see, that

the greater part of the parish was in a sense open land. It was not appropriated by the individual and fenced against all the world, but was the subject of many proprietary interests, and open more or less to the whole neighbourhood. Such was the case with the arable fields and meadows, while stinted pastures were always occupied in common, and the outlying wastes were in the same condition as the commons of our own day.

It would be foreign to my purpose to travel into any minute description of the common-field system, but one or two instances may be mentioned to indicate its character. Mr. Blamire, a Tithe Commissioner, giving evidence before the Select Committee of 1844[4] (upon whose report the Inclosure Act of 1845 was passed), gives us instances of three parishes where the common-field system still obtained. In the parish of Barmby-on-the-Marsh, Yorkshire, the open land, consisting of 1,015 a., was divided into 1,152 separate parcels, each, on the average, containing 3r. 23p., while the meadow land consisted of 352 parcels, containing 677a., or a little less than 2a. a piece on the average. These would be the small inclosures or grass yards of Marshall. In Chinnor, Oxfordshire, the open land consisted of 2,340 parcels, containing on the average 3r. 18p. each, and an aggregate of 2,016a., and there were 61 old inclosures comprising 672a. And in Cholsey in Berkshire the open land comprised 2,315 parcels, of an average of an acre, and an aggregate extent of 2,327a., while 160 old inclosures extended to 504a. Again, coming to much more recent days, the Inclosure Commissioners in 1877 gave a detailed description of the common fields of three parishes in Rutlandshire, and in 1880 a similar report in relation to a Berkshire and a Yorkshire parish. The figures stand thus:—

County.	Parish.	Population.	Common Fields.			Other Common Lands.
			Number of Strips.	Number of Owners.	Acreage.	
Rutland	Barrowden	636	2,790	40	Not stated, but probably about 2,500	In Barrowden a cow pasture, and in Barrowden and S. Luffenham together 391 acres of common or waste
,, ...	S. Luffenham	359	1,238	22	784	
,, ...	N. Luffenham	Not stated	1,631	Not stated	1,493	143 acres of common pasture and meadow
Berks	Steventon	829	1,000	20	1,162	The Cow Common, 54 acres The Green, 27 acres
York, N.R.	Riccall.....	795	1,127	43	691	

[4] Commons Reports, 1844, No. 583, p. 17.

In every case the common fields were thrown open for purposes of pasturage after the crops were carried, and during the whole of the fallow year, but the class entitled to pasture was not always the same. In the Rutland parishes the owners and occupiers of all lands in the parish had the right of pasturage; in the other cases only the owners and occupiers of the common field strips. The cow pasture and (probably) the other common pastures and meadows in the Rutlandshire parishes were also held in severalty during the early summer months for the purpose of getting a crop of hay. The Cow Common and Green at Steventon were stinted pastures, the soil of which was in the Lord of the Manor, but which were depastured exclusively by twenty-four persons, owners of 117 stints of equal value; each enabling the owner to depasture cows during a specified period of each year, and afterwards sheep. Thus it will be seen how largely, even within the last twenty years, these parishes were farmed in common, and according to fixed rules, in the manner indicated by William Marshall in the passage I have read to you.[5]

II.—*Forests.*

Mr. Maitland suggests another cause, besides a Celtic origin, for the occasional presence throughout the country of "lands of "hamlets." He suggests that they may not improbably be found "wherever there have been within the historic period large tracts "of forest land."[6] This introduces a topic which, I think, has never yet received full attention, and which I am afraid I cannot now deal with as it deserves, viz., "What area of England was in "Norman times under the sway of the Forest Laws?"

A forest in the legal sense is not, I need hardly tell you, necessarily, or merely, a large wood. It is defined by Manwood[7] as "a certain territory of woody grounds and fruitful pastures, "privileged for wild beasts and fowls of forest, chase, and warren, "to rest and abide there, in the safe protection of the king, for "his delight and pleasure." It is not, he says, inclosed, but is "meered and bounded with unremovable marks, meers, and "boundaries," such as hills, rivers, highways, and sometimes

[5] It will be noticed that the strips or parcels of the common fields approximate to either an acre or half an acre. The term acre, originally founded on the idea of a day's ploughing, seems to be intimately connected with the common field system, and to have denoted a strip the length of which was measured by the distance which a team of oxen would naturally plough without stopping, and the breadth by four ploughing beds or "selions;" but it would be impossible always to lay it out of the same size, and hence variations, which lead to an average a little under or over the acre. See Maitland, pp. 368—384.

[6] Maitland, p. 16.

[7] "Treatise of the Forest Laws." Edit. 1717, "pl. Forests," p. 143.

remarkable trees. Within its circuit there may be many inclosed grounds, villages and even towns. Thus within Waltham Forest were the old market towns of Waltham and Epping, besides many villages. The essential peculiarity of the district does not consist in being woodland,[8] or even a wild open district (though no doubt both these characteristics may generally be expected), but in being subject to the forest laws. And the main object of these laws was to keep the place *in statu quo*. Thus, speaking generally, pasture land could not be turned into arable; inclosed woods could not be felled except under conditions which would ensure their restoration; buildings could not be erected; and open uninclosed grounds could not be inclosed. The roam of the deer was preserved throughout the whole district, inclosed and uninclosed land, cultivated and waste land, alike. No landowner or farmer could erect a fence high enough to keep out a doe with her fawn, and to kill or chase out the deer even from amongst standing corn was a high misdemeanour.

Within a forest there were large rights of common—always common of pasture for cattle, and rights of pannage for pigs, and generally rights of cutting wood. The right of common is often said to have been conferred upon the inhabitants (*i.e.*, in law upon the owners and occupiers of land) within the district as a compensation for the damage done by the deer, and for the restrictions upon the beneficial occupation of the inclosed lands. It is quite as probable, however, that forestal rights of common are a survival of extensive rights previously existing in the district. The forest system prevented the growth of the manorial power, and thus preserved the more ancient character of rights which in other places were gradually made to fit in with the theories of feudal and manorial law. However this may be, forestal rights of common exist quite independently of any manorial connection, and are of a very important character. They have served to preserve Epping Forest, the New Forest, and probably the Forest of Dean and many fragments of other Royal Forests which would have otherwise been converted to tillage or game preserves when the Crown ceased to care for its old rights of chase.

The soil of the forest waste was not necessarily vested in the Crown, but might be held by subjects. In some cases we find the Crown the sole owner, as in the New Forest[9] and the Forest of Dean; in other cases there is a joint ownership of the Crown and

[8] There are forests which are almost destitute of trees, and which it is difficult to believe ever contained much wood, *e.g.*, Dartmoor and Exmoor, in the county of Devon.

[9] Even in the New Forest the soil of certain small portions of the open waste is claimed by private persons.

private persons, as in the Hainault Division of Waltham Forest, and formerly in Windsor Forest; or, again, as in Epping Forest, the Crown may not hold a single rood of waste land. The forest rights of the Crown, when exercised over the lands of subjects, are technically known as rights of forest, and are sometimes defined as rights of vert and venison, that is rights of preserving the deer (venison) and the woods and herbage (vert) of the forest for the use and protection of the deer.

The peculiar laws applicable to a forest were administered by courts existing specially for the purpose. These courts were of three grades: (1) the Court of Attachments, Woodmote, or Forty-day Court; (2) the Court of Swainmote; and (3) the Court of the Chief Justice in Eyre, or Justice Seat. At the Justice Seat all offenders were sentenced, and a general inquiry into the condition of the forest was made. For this purpose a jury of free-holders, from eighteen to twenty-four in number, was sworn, and a charge of great length and minuteness of detail was delivered to them by the Chief Justice in Eyre. The claims of all persons enjoying any special rights or exemptions in the forest (other than the right of common of[10] pasture) were also brought in, considered, and, if found valid, enrolled. In short, every step was taken to obtain a full and correct account of the state of the forest and the various rights existing therein.

Many more details of the forest system might be added, but enough has been said to show that an afforested district was in a very special condition, and though not wholly open and uninclosed, contained large tracts of wild heath and woodland.

That in Norman and even earlier times the districts under forest law were numerous as well as large in area seems to be established beyond question; but when we endeavour to obtain anything like exact particulars the difficulties are very great. It is not easy even to find a list, and we cannot be sure that the term forest is always used by writers in its legal as opposed to its popular sense. The following is the catalogue given by Gilpin in his "Forest Scenery;"[11] and Gilpin, living in the New Forest long before the Deer Removal Act, knew very well what a forest was. Commencing with the north, the list runs thus:—

[10] It was not necessary to claim the right of common of pasture at the Justice Seat. ("Manwood," edit. 1717, p. 99; "Sir William Jones, Rep.," 291.)

[11] Edit. 1794, p. 318 *et seq.*

Counties.	Forests.
Northumberland	Rothbury
	Lowes
Cumberland	Nicol
	Knaredale
	Westwood
	Inglewood
	Copeland
Westmoreland	Milburn
	Whinfield
	Martindale
	Thornthwait
	Stainmore
	Mellerstang
Durham	Langden or Teesdale
Lancashire	Lancaster or Wiresdale
	Bowland
	Simon's Wood
Yorkshire	Lime
	Applegarth, Swaledale, Wensleydale (lying together)
	Pickering
	Knaresborough
	Harewood
	Galtries
	Hardwick (round Halifax)
Cheshire	Delamere
	Macclesfield
	Wireall or Wirrall (occupying the whole peninsula between the Mersey and the Dee)
Notts	Sherwood
Shropshire	Huckstow
	King's Wood
	Bridgenorth
	Clune
Staffs	Needwood
Leicestershire	Charnwood
	Leicester (near Bosworth)
Rutlandshire	Lyfield
Hertfordshire	Bringwood
	Deerfield
	Hawood
	Acornbury
Worcestershire	Wire
	Feckingham
Northants	Rockingham
	Salcey or Sacey
	Yardly
	Whittlebury
Hunts	Wabridge or Waybridge
Gloucestershire	Dean
	Milkwood
	King's Wood
Oxfordshire	Whichwood
Bucks	Bernwood
	Clitern
Essex	Waltham
Wilts	Peevisham
	Blakemore
	Bradon
	Savernake
Berks	Windsor
Kent	Tunbridge
Sussex.....	St. Leonards
	Word
	Ashdown
	Waterdown
	Dallington
	Arundel
	Charlton
Devonshire	Dartmoor
	Exmoor
Somersetshire	Neroch (near Taunton)
	Selwood (S. of Frome)
Dorsetshire....	Gillingham
	Blackmore, or White Hart
	Purbeck (Isle of)
Hants	Chute (near Silchester)
	Harewood
	Alice Holt
	Waltham (Bishop's)
	Bere
	New

This list includes 82[12] forests, and one, that of Wolmer in Hants, is certainly omitted, unless it appears under another name. It is

[12] The writer has some acquaintance from other sources with 22 of the forests in this list.

possible however that in some instances one or more of the places named may be included in one larger forest district. For instance, Gilpin gives Epping and Hainault as separate forests, but they were always unquestionably parts of the Forest of Essex or Waltham. Some of the districts may be Chases, as Gilpin gives Cannock, Malvern, and Enfield as forests, whereas they have all been known as chases from an early date. He also mentions Hatfield in Yorkshire, Kenilworth in Warwickshire, and Cranbourne in Dorset as chases, making six in all. A chase was a district in which the venison and vert were preserved by means of rangers and other officers, and some of the minor forest courts may even have been held, but within which the Justice in Eyre held no session. It would be a work of very great labour to arrive with anything like accuracy at an estimate of the total area covered by these forests and chases, but a few facts may be mentioned as indicating their great extent. The Forest of Pickering extended from that place almost to Scarborough;[13] Knaresborough, Harewood, and Galtries together extended nearly to the walls of York.[14] In Delamere Forest the Crown allotments, on an inclosure, comprised 3,900 acres.[15] In the famous Forest of Sherwood certain tracts of waste alone contained over 3,000 acres.[16] Needwood Forest is said by Gilpin[17] to be about 25 miles in circumference, and Cannock Chase in the same county is certainly a very wide district. Charnwood Forest contained a walled park (Beaumanoir) 20 miles in circumference.[18] In Whittlewood or Whittlebury Forest the open lands and commonable woods extended to 5,400 acres, and there were five "towns" (probably parishes) within the bounds of the forest.[19] In Salcey Forest six townships or parishes were interested.[20] The Forest of Dean is described as 20 miles in length by 10 in breadth.[21] Whichwood contained about 3,500 acres of open land;[22] Alice Holt over 2,400;[23] Wolmer something like the same.[24] Windsor Forest extended over the whole of eleven parishes and parts of four parishes, all in Berks, and its open lands comprised 24,000 acres.[25] Windsor Great Park is of course a remnant of this forest. The Forest of Waltham contained over 7,000 acres of open woodland in the Epping division, and about 3,000 in the Hainault, and the legal bounds of

[13] "Gilpin," p. 320.
[14] "Gilpin," p. 322.
[15] Inclosure Act, 19 Vict., cap. 13.
[16] 58 Geo. III, cap. 23.
[17] "Gilpin," p. 325.
[18] "Gilpin," p. 327.
[19] Inclosure Acts, 5 Geo. IV, cap. xcix; 16 and 17 Vict., cap. xcii.
[20] Inclosure Act, 6 Geo. IV, cap. cxxxii.
[21] "Gilpin," p. 330.
[22] „ 16 and 17 Vict., cap. xxxvi.
[23] „ 52 Geo. III, cap. lxxii.
[24] Inclosure Acts, 52 Geo. III, cap. lxxii; 18 and 19 Vict., cap. xlvi.
[25] Inclosure Act, 53 Geo. IV, cap. lviii.

the forest stretched from the great Romford road to Nazing, and from the River Lea to Havering. The extent and character of Dartmoor and Exmoor are fairly well known. Finally, the New Forest contains about 90,000 acres, of which over 60,000 are open waste. These facts are sufficient to raise the inference, that the total area under forest law in early Norman times must have been very large.

III.—*Statutes of Merton and Westminster the Second.*

The first step in the movement for the inclosure of common lands was the passing of the Statute of Merton, in the twentieth year of Henry III. This statute, which is commendably short, ran as follows:—

"Also because many great men of England (which have "enfeoffed knights and their feeholders of small tenements in "their great manors) have complained that they cannot make "their profit of the residue of their manors as of wastes, woods, "and pastures, whereas the same feoffees have sufficient pasture "as much as belongeth to their tenements, it is provided and "granted that whenever such feoffees do bring an Assize of Novel "Disseisin for their common of pasture, and it is knowledged "before the Justices that they have as much pasture as sufficieth "to their tenements, and that they have free egress and regress "from their tenements into the pasture, then let them be contented "therewith; and they of whom it was so complained shall go "quit of as much as they have made their profit of their lands, "wastes, woods and pastures."

Turned into modern English, this statute provides that a lord of a manor may inclose part of his manorial commons, if he can prove that he has left sufficient pasture for the freehold tenants of his manor.

It was followed some years afterwards, in 1255, by the Statute of Westminster the Second, which extended the principle of approvement to commoners who were not tenants of the manor in which the waste lay, but "neighbours" claiming pasture as appurtenant to their tenements. The two statutes together enabled lords of manors to inclose against pasturage rights exercised in respect of lands either in their own manors or in the neighbourhood, but not against rights of cutting wood or taking turf or any description of sub-soil, or against a specially granted right of turning on a specific number of beasts. The second statute also contained a specific protection for small improvements, such as the erection of a windmill, a sheep-cote, or a dairy, or the enlarging of the surroundings of a mansion.

It is of course extremely difficult to say at this date what effect the Statutes of Merton and Westminster the Second had.

That they were distinctly anti-popular in their tendency, a piece of landlords' legislation, is probable from the fact that they were passed in days when the great barons of the kingdom were at the height of their power, and (as regards the Statute of Merton at least) before the people of England generally were represented. It is also significant that this sanction of inclosures was one of the very first pieces of legislation which the barons secured, and that almost cotemporaneously with legislation such as the Charta Forestæ and Ordinatio Forestæ, which limited and defined the Royal Rights of Forest. It is obvious from the language of the statutes, that they did not apply to the common fields of which we have spoken, but to commons in the ordinary run, and mainly to large commons, "wastes, woods, and pastures." It is probable that in many of the great tracts of waste then existing, a slice was cut off for a private park or preserve. Some commons, from their shape and from the character of the adjoining land, give indications of being thus truncated. Fitzherbert, writing about 1523, says, "and also the lords have inclosed a great part of their "waste grounds and straitened their tenants of their common "therein;"[26] and with such general evidence we must be satisfied. Court Rolls going so far back are very scanty, and I do not remember to have come across any entries in such rolls (and I examined a good many at one time) referring to inclosures under the statutes. Probably the statutes indicate an advance in the feudal and manorial theories, a loosening of the hold which the several village communities had of the outlying wastes in their neighbourhood, and a tightening of the grasp of the territorial magnates. That the statutes became obsolete in the course of the next two centuries, and could not be relied upon to justify an inclosure, seems to be proved by the fact that in the reign of Edward VI, in the full tide of what has been often called the agrarian revolution, it was thought necessary to re-enact them.

That during these two centuries land was being gradually inclosed is no doubt probable. The decay of the feudal system changed the position of the great landlords towards the land and the tillers of the land. Land came to be looked upon less as giving territorial power and a large following to the wars, and more as yielding revenues which could be turned to account in the way of an increase of power, of influence at Court, or of the means of luxurious living, as the great landlord preferred. Probably, therefore, as is indicated by Fitzherbert,[27] the lord of many a village

[26] Surveying, edit. 1767, p. 20.

[27] "For the most part of the lordes have widened their demesne lands and "meadows (*i.e.*, as the context shows, in the common fields), and keep them in "severalty, so that the tenants have no common with them therein."—"Survey-"ing," p. 19. Edit. 1767.

began to withdraw himself from the common farming arrangements of the place, to depend on hired rather than customary labour, and to form a more or less compact demesne farm, lying within its own fences. Then, about a hundred years after the passing of the Statute of Westminster, in 1348, came the Black Death, that scourge which is said to have swept away half the population of the country. As the whole population of England is estimated to have been less than that of London at the present day, the result of so terrible a plague must have been to leave many places scarcely peopled at all. The large landowner would be sure to profit by such an event in regard to his possession of land; though the gain was, for immediate purposes, more than counteracted by the loss of labour. When whole families amongst the peasant proprietors of the common fields were swept away, the lord of the vill with the aid of the lawyer, would appropriate the land thus left derelict. The number of persons interested in the common fields, and of commoners on the lord's wastes, would be thus diminished, and inclosures by arrangement—not to speak of inclosures by the strong hand—would be much facilitated.[28] We know that a time of great oppression followed, when the law endeavoured to compel men to work at what was certainly not a "living wage," and attempts were made to thrust back the small landowner, villain, or freeholder, into a state of semi-serfdom. The dissatisfaction culminated in the Peasants' Revolt of 1381, which, though put down with great severity, seems to have marked the lowest tide of agricultural distress. The first half of the fifteenth century is said to have been the halcyon time of the small cultivator. Labour had the control of the market, and gradually improved its position, so that on the occasion of the next peasants' revolt, that of the year 1450, the demands of the insurgents were political, not social. We may be sure that during this period there was no violent change in the conditions of the land. It was not till the Wars of the Roses were ended, that the second definite step in the history of inclosure was taken.

IV.—*Tudor Agrarian Revolution.*

The agrarian revolution of the sixteenth century has been too often described to warrant any detailed inquiry into its causes or economic results. Substantially it was a conversion of arable land into pasture, for the sake of sheep breeding. English wool commanded a high price both for home and foreign manufacture;

[28] There are records of deeds of arrangement, by which common rights were surrendered by individuals in consideration of grants of land to be held in severalty. See Kennett's "Parochial Records," ii, p. 324, quoted in Prothero's "Progress of Farming," p. 27.

it was easy of transport, and inexpensive of production. At the same time the commercial spirit was permeating the country, feudalism being dead, and towns growing in influence as compared with the old nobility every day. Thus every landowner desired to keep large flocks, and for this purpose he strove to convert the common fields of his village into pasture, and to appropriate as much of his waste as he could. That the means employed were often lawless and unjust is abundantly clear from writers of such opposite modes of thought as Sir Thomas Moore and Bishop Latimer. On the other hand, men writing from the purely agricultural point of view applauded inclosure. Thus Tusser, in his "Five Hundred Points of Good Husbandry," devotes many verses to a comparison between a "champion," *i.e.*, champaign, open field, country, and a "several," *i.e.*, inclosed district. His muse thus bursts forth:—

> "The country inclosed I praise,
> Tho' t'other delighteth not me,
> For nothing the wealth it doth raise
> To such as inferior be.
> How both of them partly I know,
> Here somewhat I mind for to show."[29]

In the course of his comparisons he alludes to Leicestershire as good soil, but producing little, on account of the open farming, while Suffolk and Essex he praises as inclosed counties. Cambridge and Norfolk are alluded to as still open.

Fitzherbert, again, advises every man to change fields with his neighbour, so that he may lay his lands together, keep more cattle, improve the soil by their "composting," and rest his corn land when it becomes impoverished.[30]

Both these writers, it will be seen, dwell upon the general increase in the productiveness of the ground, and not upon the advantages of inclosure for sheep breeding. In the old settled lands of the eastern counties the desire to improve tillage may have had some weight; but one suspects that, as in many modern inclosures, the real object, that of personal aggrandisement through conversion to grass, was often concealed under a flourish of talk about the increase in the productiveness of the country. Sir Thomas Moore's condemnation of the methods employed to get rid of the humble tiller of the soil is well known, and even Tusser, in the midst of his panegyric of inclosures, indicates that it would be better if the process were more regular.

[29] Mavor's edit., 1812, p. 203.

[30] "Surveyinge;" reprinted under title, "Certain Ancient Trusts concerning the Management of Landed Property," 1767 pp. 96—100.

" The poor at inclosures do grutch,
Because of abuses that fall,
Lest some man should have but too much,
And some again nothing at all.
If order might therein be found,
What were to the several ground ?"[31]

Bishop Latimer recurs to the subject again and again in his delightful racy English.[32] In his sermon preached before Edward VI, on the 8th March, 1549, he complains bitterly of the state of the country. All kinds of meat are dear, not because a stock does not exist, but because it is in few hands, and held back for a high price. And the country is depopulated.

" Furthermore, if the King's honour, as some men say, standeth " in the great multitude of people, then these graziers, inclosers, " and rent rearers are hinderers of the King's honour. For where " there have been a great many householders and inhabitants, " there is now but a shepherd and his dog : so they hinder the " King's honour most of all."[33]

How hardly the small tenant farmer was hit, he shows by the case of his own father's holding :—

"My father was a yeoman, and had no lands of his own, only " he had a farm of 3*l.* or 4*l.* by year at the uttermost, and " hereupon he tilled so much as kept half a dozen men. He had " walk [right of common] for 100 sheep ; and my mother " milked 30 kine. He was able and did find the King a harness, " with himself and his horse, while he came to the place where he " should receive the King's wages. I can remember that I buckled " his harness when he went unto Blackheath field. He kept me " to school, or else I had not been able to have preached before the " King's Majesty now. He married my sisters with five pound or " twenty nobles apiece ; so that he brought them up in godliness " and fear of God. He kept hospitality for his poor neighbours, " and some alms he gave to the poor. All this he did of the said " farm ; where he that now hath it, payeth 16*l.* by year or more, " and is not able to do anything for his Prince, for himself, nor " for his children, or give a cup of drink to the poor."[34]

" We have good statutes," the Bishop proceeds, " made for the " commonwealth, as touching commons and inclosures ; many

[31] P. 211.

[32] His sermon " Of the Plough " is not that which contains the most forcible passages. The " Plough " alluded to was the spiritual plough of righteous preaching. There is, however, the following sentence :—

" But there be two kinds of inclosing, to let or hinder both these kinds of " ploughing ; the one is an *inclosing* to *let* or *hinder the bodily ploughing*, and " the other to let or hinder the holiday ploughing—the Church ploughing."

[33] Parker Society edit. 1844, p. 100.

[34] Ibid., p. 101.

"meetings and sessions; but in the end of the matter there "cometh nothing forth."[35]

In the summer which followed this sermon agrarian revolts took place both in Norfolk and Devon, and Latimer and other outspoken preachers were reproached with having caused it. Latimer was not the man to be turned from his course by such complaints, and in his last sermon before the Court, preached in Lent, 1550, he returns to the subject. His discourse is on covetousness, which he alleges was the cause of the recent rebellion; and he speaks of the way in which the Royal Commission on inclosures had been defeated by the gross injustice displayed even by some of the commissioners.

"I remember mine own self a certain giant, a great man, who "sat in commission about such matters; and when the townsmen "should bring in what had been inclosed, he foamed and chafed, "and so near looked and threatened the poor men that they "durst not ask their right!"[36]

He alludes to the re-enactment in the year of the statutes of Merton and Westminster the Second, and makes the shrewd comment that "if at that time (*i.e.*, in the days of Henry III "and Edward I) it were put in their will and power (*i.e.*, the "will and power of the landlords) that they might inclose, "leaving to the tenant that was sufficient for him; if they had "it then in their power that they might this do, they would "leave no more than sufficient. If they left to the tenants and "poor commoners in those days but sufficient; then if they had "any more taken from them since that time, then had they now "not sufficient."[37] And then follows a forcible argument against inclosing, as striking at the very root of the peasant's livelihood.

"The poorest ploughman is in Christ equal with the greatest "prince that is. Let them therefore have sufficient to maintain "them, and to find them their necessaries. A plough-land must "have sheep; yea, they must have sheep to dung their land for "bearing of corn; for if they have no sheep to help to fat the "ground, they shall have but bare corn and thin. They must have "swine for their food, to make their veneries or bacon of: their "bacon is their venison, for they shall now have hangum tuum "if they get any other venison; so that bacon is their necessary "meat to feed on, which they may not lack. They must have "other cattle, as horses to draw the plough, and for carriage of "things to the market; and kine for their milk and cheese, which "they must live upon and pay their rents. These cattle must "have pasture; which pasture, if they lack, the rest must needs

[35] Parker Society, edit. 1844, p. 101.
[36] Ibid., p. 248. [37] Ibid.

" fail them ; and pasture they cannot have, if the land be taken in " and inclosed from them. Therefore, for God's love, restore " their sufficient unto them, and search no more, what is the cause " of rebellion."[38]

Both from these forcible utterances of Latimer's, and from the fact of the confirmation of the Statutes of Merton and Westminster the Second, it may be inferred that there were inclosures of common as well as of common fields at this time. But the crying complaint was the conversion of common fields into private grazing ground. The instructions to the commissioners[39] appointed to inquire of offences against the recent statutes (5 Hen. VIII, cap. 19 ; 7 Hen. VIII, cap. 1 ; 25 Hen. VIII, cap. 13 ; 27 Hen. VIII, cap. 22) directed to the prevention of inclosures show this very clearly. They are to inquire " what towns, villages, and hamlets " have been decayed and laid down by enclosures into pastures " since the fourth year of the reign of King Henry VII ?

" What lands were there in tillage at the time of the said " inclosure, and what then in pasture ?

" How many ploughs by reason of the said inclosures be " laid down ?

" How many meases, cottages, and dwelling houses have fallen " in decay, and the inhabitants of the same departed from their " habitation there, by reason of the same inclosure, and how " much land belonged unto the said tenants ?

" How many new parks be now made within the said time ?

" What arable land at the time of the making of the said parks " was imparked within the same ?

" How many ploughs, houses, and inhabitations have decayed by " imparking of the said ground ? "

Similar inquiries follow as to the enlargement of parks ; then

" If any person hath or doth keep above the number of 2,000 " sheep besides lambs of one year's age, and whether he hath kept " the same upon his own lands, or upon his farm lands, or upon " both, or otherwise by covyn or fraud.

" How many sheep ye think have been necessary for the only " expenses of such persons' household for one year.

" If any person hath letten any lands to farm or by copy of " court roll, reserving the sheep pasture of the same to himself, " and if any person hath taken from his tenants their commons, " whereby they be not able to breed and keep their cattle, and " maintain their husbandry as they were in time past.

There were also inquiries whether persons occupied more

[38] Parker Society, edit. 1844, p. 249.

[39] Strype's " Memorials," temp. Edward VI, ii, 2, p. 359.

than two houses in the same village, and whether persons who had become possessed of dissolved monasteries, kept house after the fashion of the monks, and tilled, by themselves or their farmers, the same extent of land.

The picture is completed by the observations of Mr. John Hales, one of the Commissioners, in his charge to the jury—a charge preserved for us by Strype. He tells them[40] that by "inclosure" is not meant "when a man doth inclose and hedge in "his own proper ground where no man hath commons. For "such inclosure is very beneficial to the commonwealth; it is "a cause of great increase of wood [? food]; but it is meant "thereby, when any man hath taken away and inclosed any other "men's commons, or hath pulled down houses of husbandry, and "converted the lands from tillage to pasture." He then alludes to various devices to which resort has been had to defeat the statutes. "Some have not pulled down their houses but maintain them; "howbeit no person dwelleth therein, or if there be, it is but a "shepherd or a milkmaid, and convert the lands from tillage to "pasture; and some about one hundred acres of ground or more "or less, make a furrow, and sow there; and the rest they till "not, but pasture with their sheep. And some take the lands "from their houses, and occupy them in husbandry, but let the "house out to beggars and old poor people. Some to colour the "multitude of their sheep, father them on their children, kinsfolk "and servants."

In point of fact the one object was to obtain large grazing grounds, and if men stood in the way, so much the worse for the men. Wool paid better than corn, and there was no longer any object in having populous villages or a large manorial tenantry. At a time when the possessions of religious bodies had been confiscated, and the Crown and courtiers enriched by the strong hand, there was not likely to be much scruple as to the means of attaining wealth; even the violent changes which had been made in faith, in worship, and in the constitution of the Church, tended to unsettle men's minds and to make them careless of old habits and customs. On the other hand legislation, instead of merely preventing oppression and injustice, was seeking to run counter to the economic tendencies of the day, and to make men use their own property in a way which they deemed to be inconsistent with their interests. Thus the endeavours of king and parliament (somewhat half-hearted, one must think, having regard to the re-enactment of the Statute of Merton) failed of effect, and very large inroads were no doubt made on the common-field system,

[40] Strype's "Memorials," temp. Edward VI, ii, 2, pp. 361 and 362.

and commons were in many places reduced in size. Still, if we can trust statements made much later by agricultural reformers, the efforts of the sheep-farmers were only partially successful, since even at the end of the last century the common-field system prevailed throughout a large area of the country, and with it, of course, the necessary adjuncts of commons and (generally) stinted pastures.[41]

V.—*Modern Inclosures. First Period*, 1709-1800.

In the one hundred and fifty years that passed between the agrarian revolution of the Tudors and the commencement of the modern system of inclosure, the changes in the agriculture of the country were probably slight. That some inclosures took place from time to time is not unlikely. It is pleasant to an advocate of open spaces to know that the greatest poet of the modern world was opposed to an attempt to enclose the common fields of Welcombe, near Stratford-on-Avon, and that no less a lawyer than Sir Edward Coke decided the controversy, in accordance with Shakespeare's wishes, by the dictum that "no inclosure shall be made within "the parish of Stratford, for that it is against the laws of the "Realm."[42]

Charles I, as we know, hastened his own downfall by an attempt to extend the bounds of the Royal forests over vast districts which had been in fact, if not always in law, dis-afforested. And to him we are indebted for the formation of Richmond Park, at the expense partly of the commons of Petersham and Ham, but partly also, no doubt, of the private woods and meadows of the district. Richmond Park was formed for the king's pleasure; but the attempt to enlarge the ancient forests was a mere device to raise money. The consequence of extending the forest of Essex to the great road from Chelmsford to Bishop's Stortford would have been to lay the gentlemen of Essex under enormous penalties for assarts, purprestures, and other offences against the forest law; and had such enlargements been suffered in this and other places, very large receipts must have flowed into the Exchequer. It is not to be supposed,

[41] Since this paper was written I have seen the very careful and scholarly publication (under the title of "The Domesday of Inclosures, 1517-18") by Mr. I. S. Leadam, for the Historical Society (Longmans, 1897), of the returns to Chancery by the Commissioners of Inclosures for the (ten) counties. I regret that it is impossible satisfactorily to analyse the information thus for the first time made accessible. Mr. Leadam concludes that a certain proportion of the inclosures were for arable not grass. The total area, though large, seems to support the conclusion of the text, that the bulk of the country remained a common field.

[42] Protheroe, 28, quoting Dr. Ingleby's publication of the "Private Diary of "Thos. Green," Town Clerk of Stratford, in the first years of the seventeenth century.

that any sensible quantity of land would have been actually thrown open, and certainly the king's action had nothing akin to the open space movement of the present century. The forest question was set at rest by the Statute of 16 Car. I, which enacted that the boundaries should be the same as in the twentieth year of James I. Under the Commonwealth the Crown Manors and Forests were surveyed and valued in a business-like way, and it is probable, that, had the *régime* lasted, some considerable open tracts would have been put under tillage, though at the same time there is no reason to suppose, that the interests of the commoners would have been disregarded by the most intelligent and equitable administration which England had yet seen. In the time of Charles II some attempt was again made to turn Crown wastes into money. The Crown interests over great tracts of country such as Malvern Chase were made over to "Undertakers" (like the Dutch engineer Cornelius Vermuyden), who were subsequently assisted in forcing upon the commoners a partition by Chancery Decrees and even by Acts of Parliament. The Court of Chancery indeed seems to have been sometimes invoked throughout the seventeenth century to perform the same functions as those of Commissioners under an Inclosure Act, though by what right the Court overruled dissentients, or bound persons under legal disability, is not apparent. Sir John Sinclair in his Address to the Board of Agriculture in 1795 alludes to inclosures by the aid of the Court, but states that from the difficulties and expenses attending such proceedings they had then been long disused. Although some few considerable inclosures may have been thus made,[43] the effect upon the country at large would probably not be great.

The next general movement towards inclosures came in with the last century; it was marked by an appeal for aid to the legislature. The first private Act for the inclosure of a common was passed in the year 1709, and related to the parish of Ropley, in Hants; and from this time onwards we come into the field of definite, if not very complete and exhaustive, statistics. Only one other Act was passed during the reign of Queen Anne, and but sixteen in that of George I.[44] The yearly number did not greatly increase until nearly the close of the succeeding reign. In the

[43] The writer remembers to have seen a decree of the Court for the inclosure of the Forest of Brill in Bucks. And in the reign of William III a partition of the Forest of Ashdown in Sussex between the Crown on the one hand and the Commoners on the other was carried out by the same means. See Delawarr *v.* Miles, 17 Ch. Div. 535.

[44] "The Second Report from the Committee on the Means of Promoting the "Cultivation and Improvement of Waste, Unenclosed, and Unproductive Lands," presided over by Sir John Sinclair. Printed 27th April, 1787. All the figures in relation to inclosures up to 1800 are taken from this Report.

year 1754 it first reached two figures, and during the rest of the century never fell lower. The lowest number of Acts passed in any one year during this period was eleven (in 1755), and the highest ninety-nine (in 1777).

The result in decades, from 1725 to 1795, stands thus :—

Years.	Bills.	Yearly Average.
1725–35	38	4
'35–45	39	4
'45–55	61	6
'55–65	312	31
'65–75	471	47
'75–85	469	47
'85–95	371	37

Thus we see that the high water mark of this inclosure movement was reached during the twenty years from 1765 to 1785. It is said that the movement really indicated a reaction from the agrarian policy of the Tudor period, a reversion from sheep-farming to tillage. The population of England was increasing owing to the progress of manufactures, and a market outside his own parish was thus offered to the farmer, while at the same time the wars in which the country was constantly engaged made a considerable home production of corn desirable. The common-field system was no doubt unproductive compared with a system of inclosed farming. If the arable fields were ploughed and worked in common, as was of course the original intention, serious obstacles were placed in the way of individual improvements. If, on the other hand, each man tilled his own patches, the waste of time arising from their dispersion in all parts of the field was obviously an equal drawback. If private effort was to be encouraged, and private capital attracted to the land, large inclosures of the common fields became absolutely necessary, and the general state of education and the isolation of one rural district from another made anything like improved co-operative farming impossible—indeed we do not seem to be much nearer to it in the present day. The common-field system was therefore primarily aimed at by the inclosure movement of the eighteenth century, and it is probable that the great bulk of the land inclosed was common field land. Unfortunately Sir John Sinclair's committee of 1797, which has given us the figures relating to the inclosures of the century, found it impossible to distinguish between the commons and the common fields comprised in the Acts which had been passed. Probably an Inclosure Act most often related to a whole parish, and comprised at once common fields and waste; it is hardly likely that many Acts of this period

related to waste alone.[45] A general examination of the figures supports this view. Thus, to deal first with totals, there were passed during this period 1,776 Acts in all, dealing with an estimated aggregate acreage of 2,837,873 acres. The acreage is only an estimate, because 466 Acts out of the 1,776 did not state the acreage of the lands inclosed. The committee therefore arrived at their total by taking an average in each county from the Acts stating acreage, and applying this figure to the Acts which contain no such statement. It is obvious that in a county where the Acts were few this method may be greatly out, and it may be a question whether the application of an average on the whole number of Acts would not be as safe a guide. The results of the two methods are shown in the following table:—

Inclosures between 1709 *and* 1797.

	Number of Acts stating Extent of Inclosure.	Area Inclosed.	Number of Acts not stating Extent.	Probable Area.		Total Number of Acts.	Total Area.	
				(1.) On Average of Separate Counties.	(2.) On General Average.		(1.) On Average of Separate Counties.	(2.) On General Average.
England	1,297	1,997,372	464	806,501	714,560	1,761	2,803,873	2,711,932
Wales	13	28,596	2	4,607	4,398	15	33,203	32,994
	1,310	2,025,968	466	811,108	718,958	1,776	2,837,076	2,744,926

If then we take a general average, we find that the area inclosed by each Act in England was 1,540 acres, and in Wales nearly 2,200 acres. But the Welsh inclosures were so few, only 15 in all, that they may almost be disregarded. An average of 1,540 acres is, as we shall see presently, very far in excess of that which is shown by the more recent series of Acts. If this average were produced by exceptionally large inclosures in a few counties, it would in itself offer no indication of the general character of the land inclosed. But this is not so. In the first place there is no inclosure whatever in Devon or Cornwall, so that the great wastes of Dartmoor and Exmoor and the wild districts of the far west do not enter into the calculation. The counties of the extreme north no doubt do something to bring up the average.

			Acres apiece.
In Northumberland there are	30	inclosures averaging	3,700
„ Durham	26	„ „	2,485
„ Cumberland	18	„ „	3,512
„ Westmoreland	13	„ „	1,079

[45] The fact that the Reports to the Committee of 1795, showed the existence of enormous districts of moor, and swamp, and forest, gives countenance to the view, that comparatively little was done during this period to encourage the inclosure of great wastes, as distinguished from common field parishes.

But the inclosures of Lincoln and Norfolk, neither of them mountainous counties, average 2,400 and 2,000 respectively, and by their considerable numbers, 172 in Lincoln and 53 in Norfolk, play a more important part in producing the final figures. In the large county of Yorkshire again 315 inclosures give an average of 1,278 acres, much too small an average if the wide stretching moors (of which, in 1873, according to an estimate of the Inclosure Commission, 365,000 acres, subject to manorial rights, remained) had been to any large extent embraced in the inclosures; moreover, we learn from one of the reports to Sir J. Sinclair's Commission that the common fields in the North Riding were disappearing every year under the effect of Inclosure Acts, while the moors loudly cried for improvement. Coming to Midland counties, where the common-field system is known to have been general, and where, owing to the character of the land, wastes are not likely to have been large—

			Acres.
In Beds[46]	31	inclosures give an average of	1,760
„ Hunts[47]	27	„ „	1,678
„ Leicestershire	135	„ „	1,370
„ Warwickshire	69	„ „	1,290
„ Northants	127	„ „ nearly	1,630
„ Oxfordshire	67	„ „	1,500
„ Rutlandshire	18	„ „	
While on the Northern edge			
Notts with	79	„ „ „	1,800
And Staffs[48] with	38	„ „ about	1,000

These prevailing high figures and their near approach in different counties of the same general character afford strong evidence that not wastes but common fields were the main subject of the inclosures.

One or two other county averages are interesting and significant. We have seen that in the early part of the sixteenth century Suffolk and Essex had already largely discarded the champaign or common-field system, and rejoiced the heart of Mr. Tusser by their inclosures. Moreover these counties, together with Norfolk, Lincolnshire, and Leicestershire, are mentioned by the agricultural writers of the last century, Arthur Young and Marshall, as in advance of others in tillage and stock breeding. In Suffolk and

[46] In Beds it is said that even in 1794 about 24 out of 84 thousand acres of arable land were in open fields.

[47] Cambs. is omitted because only seven inclosures took place, but these averaged 1,250 acres. Mr. Maitland states (pp. 13, 16) that of all counties Cambs. is the one whose ancient geography is the most easily traced; the common-field system was still prevalent there when the first Ordnance Survey was made.

[48] The northern part of Staffs. contains much wild land to the present day.

Essex leases for terms of years were not unknown.[49] Apparently on this account the eighteenth century inclosure movement scarcely touched these counties; there were no common fields for it to work upon. In Suffolk only eight inclosures took place, each averaging a little over 1,000 acres, while Essex saw only three, containing an average of slightly more than 500 each.[50] Again, the tale told by the home counties is curious. Hertford and Middlesex, akin to the Midlands, show respectively nine inclosures of 1,337 acres, and five of 1575. But south of the Thames there is a very different state of things. Surrey with its wide tracts of heath and down, and its abundance of commons of all sizes, supplies only three small inclosures averaging 200 acres each, and Sussex only four, of less than 500; while not a single inclosure occurred in Kent. Now Kent, Sussex, and parts of Surrey were largely occupied in pre-Norman days by the Andred's Wald, the weald of modern times. Into this district the system of village settlement and the super-imposed manorial system never effectually penetrated. The enormous forest of Roman and Saxon times was gradually cleared in patches, and settlements formed; but not after the fashion of the Midlands. It would be found, I am confident, to be a district of hamlets and not of villages. Large tracts of waste there were, fragments of the old "Wald," Ashdown and St. Leonard's Forests, but even ordinary commons do not occur to a very large extent. Consequently these counties were unaffected by an inclosure movement, which, as I think I have now shown, had for its main object the abolition of common fields.

VI.—*Modern Inclosures. Second Period*, 1800-42.

Serious, however, as was the blow thus inflicted upon the common-field system, the agricultural reformers of the last century were not satisfied. In consequence of the urgent demand for increased food supplies, and the representations made by Arthur Young and others on the backward state of the country and its potential wealth, in 1793 a Board of Agriculture was founded, with Sir John Sinclair for its president and Young as its secretary. Reports from what in the present day we should call assistant-commissioners were obtained as to the condition of the different counties, and startling statements were received as to the large area in some parts still cultivated in common, and the enormous tracts of waste and swamp in others. On the motion of Sinclair a Select Committee of the House of Commons was appointed to consider "the means of promoting the cultivation and improve-

[49] Prothero, 55, 58.

[50] Essex, in 1794, is said to have contained 15,000 acres of waste, of which Epping and Hainault Forests would account for two-thirds.

"ment of the waste, unenclosed, and unproductive lands of the "kingdom." The Committee, which made three reports, in 1795, 1797, and 1800,[51] after stating the progress already made by means of private inclosure Bills, applied itself to the question how the expenses of legalising inclosures might be diminished. The result was the first General Inclosure Act, that of 1801. This Act is what would be called at the present day an Inclosure Clauses Act. It contained a number of provisions applicable to inclosures which could be incorporated by reference in a private Bill, just as the Lands Clauses Act contains provisions as to the acquisition of lands for industrial undertakings, which are incorporated in every private Act by which it is proposed to take lands for such purposes. By this means it was proposed largely to diminish the length and consequently the expense of private Inclosure Bills. The principle of carrying out each inclosure by special commissioners was, however, still maintained.

The stimulus thus given to inclosure produced a marked effect. The number of Acts which had sunk to 371 in the ten years ending in 1795, rose to 905, or 90 per annum, in the first ten years of the century.[52] In 1801 alone no less than 119 Acts were passed, many of them dealing with enormous tracts of country. Thus, we find three inclosures of Lincolnshire Fens, comprising together 53,500 acres. Needwood Forest, containing nearly 10,000 acres, is dealt with by another Act; Enfield Chase, with 3,500, by another. Two Yorkshire inclosures (Kettlewell and Coniston, West Riding, and Weaverthorp and Helperthorp, East Riding) account for over 16,000 acres. These inclosures probably related to great wastes. But there were large common-field inclosures at the same time; a single case in Hertfordshire covering 7,000 acres, and two in Cambridgeshire 7,500. The average area inclosed by each Act in this year was 2,544 acres, and, taking a proportion, where the amount is not stated, the total area inclosed was 300,413 acres. Looking down the names from year to year we find further evidence of the application of inclosure to great tracts of waste. In 1803, Alston Moor in Cumberland, containing 20,000 acres, and Penrith in the same county, containing 28,000 acres, were the subject of inclosure Acts. Canford Heath, Dorset, 9,000 acres, in 1805, Hathersage, Derby, 10,000, and Charnwood Forest, 18,000 acres, in 1808, Holme, in the West Riding of Yorkshire, 18,300, in 1828; are further specimens of gigantic inclosures.

[51] These reports were reprinted for the Commons Preservation Society in 1866.

[52] There are no statistics for the five years from 1795—1800. Possibly, as improvements in procedure were under discussion, there may have been some lull in the storm of applications to the legislature.

While, however, inclosure was still busy with great areas it no longer despised small things. We find, in the list, Acts dealing with a common field of 40 acres at Cambridge (1801), with Newton Common, of 140 acres, in Manchester (1802), with a small common of 32 acres in the parish of Runcorn (now the site of the present Ship Canal), (1803), with such microscopic open spaces as 14 acres at Wells, in Norfolk, and at Bawdsey in Suffolk (1811), and 15 acres in a Welsh parish. Even metropolitan commons were invaded—Merton Common in Surrey, the commons of Lambeth, 200 acres (1804),[53] and Chiswick Common, of 40 acres (1814), were reduced to severalty ownership. Inclosure was evidently running riot, and reducing to severalty ownership not merely common fields, fen, and moor, but the open lands of towns and even village greens, which could by no possibility add appreciably to the food supplies of the country, and which have long since been devoted to building. This is a not unnatural result from a movement, which, undoubtedly promoted on public grounds, nevertheless readily lent itself to private and purely selfish aggrandisement. It is due no doubt to the miscellaneous character of the lands inclosed—as compared with that of the eighteenth century inclosures—that notwithstanding the great waste tracts brought under the system in the early years of this century, the average size of the inclosures (given by the Acts in which the acreage was stated) was only 657 acres, whereas in the previous period it was 1,500. To obtain the average for each county would be a work of some time. But I have been able, by an analysis of the returns made in 1843, to ascertain the number of inclosures made in each county, and thus to compare the local progress of inclosure during the two periods.[54] In the four counties of the extreme north the movement was, as might be anticipated, greatly accelerated. Whereas during the eighteenth century only 87 inclosures took place, between 1800 and 1842 there were no less than 128. In the three great counties of York, Lancaster, and Lincoln, on the other hand, there was a distinct falling off, the aggregate dropping from 515 to 355. In Lancaster there have never been very many inclosures, the common-field system possibly not having taken very firm root on the west of the Pennines. Yorkshire and Lincolnshire were among the first counties to embrace inclosure; consequently though the numbers are still high between 1800 and 1842, they show some falling off, in Yorkshire from 315 to 232, in Lincolnshire from 172 to 90. When we come to East Anglia a very different tale is told. In Norfolk the number of inclosures rose

[53] 200 acres of "common wood" in Lambeth, not mentioned in the return, were included in the same Act.

[54] See Table I.

from 53 to 200, indicating that with the advent of Mr. Coke of Holkham, and the assumption by the county of the first place in scientific farming, a vigorous effort was made to get rid of common fields, and doubtless also of some open waste. In Suffolk and Essex, which were inclosed counties in the time of Tusser, Parliament was obviously at work on the abolition of commons. The inclosures rose from 8 to 64, and from 3 to 34, and one is struck in looking through the list to see in how many cases they relate to very small areas. The aggregate number of inclosures for East Anglia rose from 64 to 298. In the Midland counties we have very varying figures. Cambridgeshire, which was scarcely touched by the inclosures of the last century, set herself, after 1800, to abolish her common fields; no less than 88 Acts related to this county. Leicestershire on the other hand, formerly full of common fields, had apparently abolished most of them before the close of the century, for her Inclosure Acts fell from 135 to 14. In Huntingdonshire the process went on evenly, but in all the other Midlands there was a falling off, and the aggregrate of inclosures in the eight counties[55] fell from 481 to 313. So in the two outliers, Nottinghamshire and Staffordshire, 117 Acts were replaced by 76. In the home counties, on the other hand, inclosure was busy for the first time; 38 inclosures took place in Surrey; and 32 in Sussex; but Kent, having little to inclose, only gave rise to 15 Acts. The aggregate of the five counties rose from 21 to 126. In the retired counties of Wiltshire and Dorsetshire the number of inclosures was nearly doubled. Devonshire and Cornwall were absolutely untouched, it will be remembered, by the inclosures of the eighteenth century. They have never taken very kindly to the process, probably having few common fields, but between 1800 and 1843 there were 26 inclosures in Devonshire and 2 in Cornwall The mountains and wastes of Wales were however extensively affected. The 15 inclosures of last century rose to 82 in the first half of the present.

Turning now to the grand totals, we have 1,997 (for convenience we may perhaps refer to it as 2,000) Acts between the years 1801 and 1842 both inclusive, as compared with 1,776 between 1709 and 1797. Seeing that the second period was less than half the length of the first, it is clear that the exhortations of agricultural reformers and the cheapening of Parliamentary procedure more than doubled the pace of inclosure. Nevertheless the area inclosed, so far as can be ascertained, was much smaller, and that, notwithstanding the large tracts occassionly dealt with by single Acts. In the first period it exceeded 2,700,000 acres, while

[55] Bedfordshire, Cambridgeshire, Huntingdonshire, Leicestershire, Warwickshire, Northamptonshire, Oxfordshire, and Rutlandshire.

adopting the same mode of estimate, in the second period it only reached 1,307,964 acres. The reason, I venture to think, is obvious. The greatest inroad on the common-field system had been made in the first period, and only a remnant, though still a large remnant remained for the present century to deal with. To this remnant were added fens and moors of vast extent, and unfortunately, on the other hand, a large acreage of what we ordinarily understand as commons, land mostly of poor quality, and really more valuable in an open than in an inclosed state.

Notwithstanding the enlarged area in kind which fell under the harrow of inclosure, the movement soon spent its force. While the average number of Acts between 1801 and 1810 was, as we have seen, 90 per annum, the corresponding number for the next decade fell to 74; from 1820 to 1830 only 192 Acts were passed; and between 1830 and 1840 only 125.

VII.—*Modern Inclosures. Third Period*, 1845-69.

In 1862 therefore it was thought necessary to apply some further stimulus to the flagging horse of inclosure. Lord Worsley moved for a return of the Acts passed since 1800,[56] and of the area of the common or waste lands in England and Wales still remaining, so far as the same could be ascertained from the documents connected with the apportionment and commutation of tithes. The later return, judging from subsequent Acts, seems to have greatly overstated the remaining area of waste. The aggregate area of the parishes in which the tithes had been commuted was—

	Acres.
In England	6,718,523
„ Wales	1,897,592
	8,616,115

and the common or waste land in these parishes was found to be—

	Acres.
In England	1,358,419
„ Wales	501,815
	1,860,234

A rule-of-three sum was then worked out, on the basis that the total acreage of the country was 37,000,000 of acres. The answer to this sum was 8,000,000, and to this were added another 2,000,000 as representing common fields, giving a total of 10,000,000 acres

[56] It is from this Return of 1843, No. 325, that the statistics given above are taken.

still held more or less in common. It is rather remarkable that Sir John Sinclair in 1795 gave the following estimate:—

	Acres.
Wastes and commons	7,800,000
Common fields	1,200,000
	9,000,000

If both estimates were correct, the commons and common fields had behaved in a manner even more remarkable than the famous widow's cruise, for though 1,300,000 had been inclosed since Sir John Sinclair spoke and wrote, the area remaining to be inclosed had actually increased by another million acres. There can be no doubt, that both of these early estimates were founded on insufficient data. The area over which the tithes were commuted in 1843 was too small to give a correct proportion for the rest of the country; and moreover the tithe agreements and awards which were used for the figures in the commuted parishes drew no distinction between land subject to common rights and land held in severalty but not cultivated. Thus, mountains and moors, not really common land, and not improbably large areas which had actually been the subject of inclosure Acts—but had been allowed to lie open—were entered in the Return.

But, at the time, the Return and the sum worked out from it were received as gospel, and a Select Committee was appointed to inquire "into the expediency of facilitating the inclosure and "improvement of commons and lands held in common, and into "the best means of providing for the same."[57] Lord Worsley, who had already introduced a Bill on the subject, acted as Chairman, and Tithe Commissioners led off the argument for some new means of promoting inclosure. The main drift of the inquiry was towards the further cheapening of the procedure by which inclosures were effected, and the result was a Report to the effect "that it "appears to be both desirable and expedient, under the provisions "of a General Inclosure Act, to entrust the superintendence of all "applications for inclosure of land, and the carrying of the "same into operation, to some central body, to which all local "functionaries should be responsible; but that the sanction of "Parliament, in regard to all inclosures sanctioned by a central "body of commissioners, should be requisite before their decision "should have effect." The last sentence seems to have been the result of an uneasy suspicion, forming itself even at this comparatively early date, that inclosure was not an unmixed blessing. Several advocates of inclosure strongly condemned

[57] Commons Reports, 1844, No. 583.

the inclosure of village greens; and there are many indications in the evidence, that it was beginning to be noticed, that while inclosure might be beneficial to the community, in increasing food supplies, and to individuals, in raising rents and farming profits, it was driving the small cultivator out of existence, and placing the cottager and labourer under distinctly less happy conditions of life. The Commission were therefore agreed that it was not safe to withdraw inclosure proceedings entirely from the purview of Parliament. One member of the Commission, Lord Granville Somerset, would even have gone further, and postponed action altogether; but the tide was still flowing strongly towards inclosure, and he found no support.

The Committee reported in August, 1844, and in the following session the Inclosure Act, 1845, was passed. As is well known, it established the Inclosure Commission—in practice the same body as the Tithe Commission—and entrusted to this tribunal, working by the aid of assistant commissioners and valuers,—

(1) All the preliminary inquiries into the expediency of an inclosure, and the views of those legally interested.
(2) The actual division of the land, after Parliament had sanctioned the inclosure upon the recommendation of the committee.

The Act contained several provisions which mark the commencement of the counter-movement for open spaces. No village green or town green was to be inclosed under the Act; and no lands within certain distances of large towns were to be inclosed without the express sanction of Parliament. Further, in the case of commons or wastes, the committee were authorised to require allotments to be set out—

(*a*) For recreation; and
(*b*) For field gardens for the labouring poor.

In the older inclosure Acts it was by no means uncommon to set aside large areas to supply fuel for the poor; but the provisions to which we have referred were the first recognition in a general Act of the value of a common to the neighbourhood, and the propriety of giving some kind of equivalent for its loss.

The Act of 1845 in one respect did not quite carry out the express wishes of the select committee; it only required express parliamentary sanction to an inclosure of a common; common fields might be inclosed by the committee without reference to Parliament. This distinction was however abolished in 1852, and since that year every inclosure has been brought to the notice of the legislature.

It is unfortunate that the "Return of Inclosures under the Act

"of 1845" which was made in 1870 is not arranged by years, so that it is difficult to tell to what extent the work was immediately stimulated, and to what extent it was falling off before it was brought to a standstill in 1869. But in the twenty-four years during which the Inclosure Commission held absolute sway, the total number of inclosures authorised was 946, and the area inclosed about 618,000 acres.[58] These figures give an average of 653 acres to each inclosure. Thus we see that both as regards the average number of applications to Parliament each year, and the average acreage concerned in each application, there is no very marked difference between this and the preceding period. From 1801-42 there were on the average 47 inclosures sanctioned annually; from 1845-69, 39. The average area per inclosure was 657 acres during the first period, and 653 during the second. When we look down the list of lands inclosed returned in 1870,[59] we find that inclosure was being gradually diverted from common fields to commons, the area of waste inclosed being more than double that of common field land. The average of common field inclosures varies very much, the smallness of some of the figures indicating that stinted pastures or common meadows rather than arable fields were the subject of the Act. On the other hand, there are many large areas of moor and high-lying waste brought under the system, and there seem to be fewer cases of very small commons.

When we compare the proceedings by groups of counties, we find the rate of progress more than maintained in the extreme north, though owing to the shorter period the actual number of applications was fewer. In Lancashire, Yorkshire, and Lincolnshire there is however a great falling off, and also in East Anglia, and in the Midlands, while in the home counties, in Devon and Cornwall, and in Wales, there is a very great increase. All these results point to the approximate disappearance of the old arable common fields, and also of the best quality of commons and wastes. The richer corn counties were practically inclosed before the passing of the Act of 1845. What the Commissioners have mainly been engaged upon is the extension of inclosures to the wilder districts of the country, and to the poorer soils such as are found on the Surrey heaths. It is well known that in many cases of poor heath land the inclosures have altered the legal status, but not the agricultural condition. Cannock Chase has been much spoilt in appearance by inclosure; the bulk of it lies as waste as in

[58] "Report of Board of Agriculture" for 1896-97 [C–8377]. A few inclosures sanctioned by parliament between 1869 and 1876 are included in these figures.

[59] Return to House of Commons of all inclosures since the Inclosure Act of 1845, 1870 (326).

Norman days. And close to our own doors, the great commons on and around Hindhead grew furze and heather as luxuriantly as ever, until they were called upon to grow houses. If it were possible to make inquiry into the comparative results of the inclosures before and since 1845, it would probably be found that the benefit to the country in increasing food supplies has been very slight during the later period, and that the condition of the country as a whole would have been happier had the process of inclosure stopped with the inquiry of 1843.

One word should be said upon the fate of the long list of forests which I read to you. Without further inquiry than I have been able to make, I cannot deal with the list seriatim, but some particulars may be given. Needwood and Charnwood were inclosed by ordinary Inclosure Acts early in the century. Rockingham, Sherwood, Delamere, Windsor, Salcey, Whittlebury, Whichwood, Alice Holt, and Wolmer were all the subject of special Acts of the same period. Savernake is fenced round, but otherwise preserves many of its features. Hainault (one of the two members of Waltham Forest) was disafforested by an Act of 1851. The forest of Bernewood, or Brill, in Bucks, was inclosed under an old decree of the Court of Chancery; and it is very probable that other forests were similarly dealt with. Ashdown, in Sussex, was partitioned between the Crown grantee and the commoners in the time of William III, but the commoners' share is happily still open, and, being the subject of a Regulation Scheme of the Board of Agriculture, is now practically dedicated to the public. The Forest of Dean still exists, but has been wholly planted over; it is a nursery of timber in the strict sense of the term but is at the same time an open space. Exmoor has been disafforested and (nominally) inclosed. Dartmoor remains. Epping has been formally, and the New Forest, in effect, dedicated to the public. It should be added that the Act of Charles I for the certainty of forests, disafforested all places in which a Justice Seat had not been held for sixty years before the 20th year of James I. This enactment probably had the effect of depriving some of the districts mentioned by Gilpin of their distinctive character.

To return to the general effect of inclosures upon the country; the Inclosure Commissioners on the 27th November, 1873, made a Return to the House of Commons of the waste lands and common-field lands in each parish in which the tithes had been commuted, and the estimated total acreage of such lands in the remaining parishes of each county.[60] This return showed how fallacious the estimate of 1843 had been. The total area ascertained after this fashion was :—

[60] "Inclosures," 1874, No. 85.

	Commons.		Common Fields.
	Apparently Suitable for Cultivation.	Apparently Mountain or otherwise Unsuitable.	
England	732,518	967,531	250,868
Wales	151,471	516,945	13,439
	883,989	1,484,476	264,307
Grand total		2,632,772	

It will be remembered that the previous estimate of 1843 was 10,000,000, and that only 618,000 had since been inclosed!

But even the return of 1873 is not altogether trustworthy. The method employed was to take each county separately, to extract the particulars of the commons and common fields for each parish where the tithes had been commuted, then to ascertain the area of the remaining parishes, and then to add a proportionate area of common and common fields. It is obvious that in a county where the great majority of the parishes had been commuted the estimate so framed would be much nearer the fact than in a county where commutation had not gone far. In particular, in a county of the latter sort, to apply a rule-of-three sum to so fast diminishing an item as common fields, was obviously a very hazardous proceeding. To take only one or two counties: in Beds the area in which the tithes had been commuted was little more than half the area of the county, while in Berks it represented four-fifths. Obviously the estimate for Berks was of much more authority than that for Beds.

Again, in Cornwall and Devon nearly the whole counties had been commuted, while in Northants only 148 out of 485 thousand acres had undergone the process. These inequalities divest the return of any great authority, and it seems probable that its estimates were still much too high.

By good fortune, in July, 1875, another return, compiled from perfectly different sources, was presented to Parliament—the Landowners' Return, which is usually referred to as the modern Domesday Book. This return was compiled from the Valuation Lists made out for the purposes of rating in every parish. *Primâ facie* such lists would not show waste lands which yielded no profit, and were therefore not rated; but the clerk of the guardians, in furnishing his return, was requested to add such information as he possessed on the subject. In some instances parish maps or surveys were forthcoming, and in others a mere estimate was furnished. The result was somewhat startling as compared with the Inclosure

Commissioners' return. Whereas the latter showed an aggregate of common land of 2,368,465 acres, the Domesday return gave only 1,524,648 acres.

Neither return can be looked upon as of conclusive authority. It is probable that in lowland counties the Domesday return is far nearer the truth than that compiled from the tithe maps; while possibly in mountainous and moorland districts the real acreage may lie between the two figures given. The Domesday return does not, of course, deal with common fields, which being rateable fall in with other holdings.

Speaking broadly, then, we may say of the inclosure movement of the last and present centuries, that it has reduced to severalty ownership—

	Acres.
From 1709 to 1797	2,744,926
„ 1801 „ 1842	1,307,964
„ '45 „ '69	618,000
Add for forests inclosed under special Acts (say)	100,000
Total of land inclosed	4,770,890

The area of open land left cannot be stated with any certainty. Common fields exist only exceptionaly. Over large areas in the Midlands there is scarcely an acre of common land, but in highland, exposed countries there are still wide tracts of open moor, mostly, though not wholly, subject to common rights. And fortunately in the neighbourhood of the metropolis, mainly on the south, there are many commons, greens, and heaths spared to constitute a play ground for the greatest aggregation of human beings the world has ever seen.

VIII.—*Counter-Movement. Suburban Commons.*

I have left but little time to describe the counter-movement of the last thirty years for the preservation of open spaces. But this is the less to be regretted, as Mr. Shaw Lefevre has not long since told the story with much graphic detail in his book on "English Commons and Forests." The general causes which led to the movement are not far to seek. The rapid growth of the population of large towns, and especially of London, forced upon the attention of the nation the necessity of preserving lands in their vicinity for purposes of health and recreation. At the same time free trade, in bringing under contribution for the requirements of the country corn-bearing lands in all parts of the world, removed the main reason which had always been urged for the cultivation of waste lands.

The first check to the process of inclosure occurred in 1864,

when the Inclosure Commissioners thoughtlessly ventured to lay hands on Epsom Common. Although the Downs themselves were not threatened, there was something in the name which attracted attention. At the same time, Lord Spencer introduced a Bill for the inclosure of Wimbledon Common, 700 acres of which he proposed to convert into a park at the expense of the remaining 300 acres, which were to be appropriated for building. Other commons on the very threshold of London, such as Wandsworth, Barnes, and Tooting, were being sliced and carved by railway companies and the governors of charitable institutions.

In 1865, a Select Committee of the House of Commons, of which Mr. Locke, the late Member for Southwark, was chairman, and Mr. Shaw-Lefevre was a most active member, after taking much evidence of the extent to which metropolitan commons were used for the purposes of recreation, reported that it was of the highest importance "to preserve all the London commons as open spaces for "the purposes of health and enjoyment;" they moreover recommended, that this result should be obtained, not by the conversion of commons into parks by the process of purchase and extinction of rights, but by the maintenance of the commons through the agency of rights exercised over them in their existing open condition, subject only to such regulations as were necessary to prevent nuisances and preserve order.

To give effect to the views thus defined, the Commons Preservation Society was formed in the winter of 1865-66, with Mr. Shaw-Lefevre as chairman, a post he has filled, when not prevented by Ministerial duties, from that time to the present.

Simultaneously with the formation of the Society a series of attacks upon the London commons were made by lords of manors. Sir Thomas Wilson began to build a house on the site of Hampstead Heath. Lord Brownlow erected 3 miles of fencing on Berkhamsted Common. An inclosure of 1,000 acres was made by a single lord of a manor in Epping Forest, while on other commons, such as Plumstead and Tooting, claims were advanced which threatened to deprive the public of all enjoyment of these open spaces.

To meet these attacks, a series of local committees were formed under the guidance of the Commons Preservation Society, and legal proceedings in the names of commoners were commenced. The result was entirely satisfactory. Decree after decree was made in favour of the commoners, and while London Commons were thus preserved from destruction, opinion was formed throughout the country, and a check given to views on the subject of manorial rights, the triumph of which would have been fatal to the national enjoyment of open land.

IX.—*Mr. Fawcett and Rural Inclosures.*

In the meantime, the Inclosure Commissioners had been, by the Metropolitan Commons Act, 1866, forbidden to continue their work of inclosure within the Metropolitan Police District, power being conferred upon them to place such commons under local management as open spaces in lieu of inclosing them. For the next three years, however, they continued to recommend to Parliament the inclosure of rural commons.

Singularly enough, the provisions made in 1845 for the reservation of portions of inclosed commons for purposes of recreation, and to supply the poor with field-gardens, appear to have fallen out of favour with the Commissioners, and in 1869 they proposed to Parliament the inclosure of 13,000 acres, with the reservation of only one acre for recreation, and none at all for field-gardens. This scheme attracted the attention of the late Mr. Fawcett, who was led to the conclusion that in the altered condition of the country, inclosures even in rural districts were doing more harm than good, and that, under such conditions as the Inclosure Commissioners were prescribing, they constituted a serious evil. With characteristic intrepidity he opposed the Annual Inclosure Bill which was promoted by the Government on the Report of the Commissioners, and the passage of which through Parliament had become a matter of course. With great difficulty he succeeded in stopping the measure and procuring a Select Committee on the subject. Before this Committee evidence of great weight was given by a gentleman who had served on a recent Commission relating to the employment of women and children in agriculture, to the effect that the condition of the agricultural labourer had undoubtedly deteriorated under the operation of inclosures. The cottager who had previously enjoyed a run upon the common for his cow and his pigs, and had used gorse and bushes for firing and petty repairs, and bracken for litter, was deprived of all these benefits, and either obtained no compensation whatever, or received some small sum of money which was very shortly spent. For practical purposes his condition was rendered so much the worse by the value of the small privileges which he had enjoyed and now lost. This and similar evidence from localities in which inclosures had been made, or where they were threatened, led the Committee to report that no further inclosures should be made until the Inclosures Act had been materially amended, and the procedure of the commissioners modified.

This recommendation led to the temporary cessation of inclosures, and for the next seven years, although the Commissioners recommended various schemes, no further inclosure

was sanctioned. In 1876, the Conservative Government of the day introduced the Commons Act, in which the principle was distinctly enunciated that inclosures should not be allowed in future unless distinctly shown to be not merely for the benefit of private persons, but for the benefit of the neighbourhood and the public; and that mode of dealing with commons which had been adopted in 1866 in the case of London, viz., their regulation as open spaces, was, with some modification, extended to the country generally. The Bill was much discussed in the House, and many amendments for the further protection of the public against inclosures were introduced. The Government further undertook, that after the passing of the Act all proposals for inclosure should be submitted to a Committee of the House of Commons.

The result has been very remarkable. The first recommendations of the Inclosure Commissioners were rigorously examined by the Committee of the House, and it was made evident that the policy of the Act was to be a reality. The Commissioners in no long time cordially adopted the views of the House, and they have for many years systematically refused to recommend inclosures in any but very exceptional cases. Practically their proposals have lately been confined to common fields and to large tracts of waste in mountain districts, and, even in the latter case, they have required the insertion of a provision that the access of the public shall not be interfered with, unless the lands are actually brought into tillage or put under cultivation. The net result of their proceedings under the Act of 1876 is thus summed up in their last Report:—

	Number.	Acres.
Inclosures	23	25,704
Commons placed under regulation	24	31,081

No Inclosure Award has been made since the year 1893.

X.—*The Rescue of Epping Forest.*

In referring to the Commons Act and its results I have however departed from the historical sequence of events. One of the most conspicuous incidents in the movement for the preservation of open spaces is the rescue of Epping Forest. I have alluded to the great inclosure in the Manor of Loughton, which was effected about the time when the Select Committee was formulating to the House new principles for dealing with uninclosed commons and forests. This aggression was the last act in a series which resulted in the inclosure of no less than 4,000 out of 7,000 acres of open

woodland and wastes. It was not allowed to pass unchallenged. Legal proceedings were commenced in the name of a working-man to assert a time-honoured custom with the inhabitants to lop the trees of the forest during the winter months. This suit and other legal skirmishes in the law courts went on for the next four years; but in 1871 the battle began in earnest with the appearance of the Corporation of London as the champion of the public. The corporation, through the Commissioners of Sewers, were happily the owners of a cemetery at Little Ilford, within the bounds of the forest. The land forming the cemetery had formerly been a minor manor, the manor of Aldersbrook. As the owners of this property they claimed on behalf of themselves and the other owners and occupiers of land within the forest boundaries a right of common over all the wastes of the forest. There were fourteen defendants to the suit, which lasted more than three years. During the same time a Commission, appointed by Parliament under a special Act, sat to inquire of the several rights obtaining in the forest, and of the validity of the inclosures. Both tribunals, the Commission, and the late Master of the Rolls, Sir George Jessel, before whom the suit was tried, pronounced unhesitatingly in favour of the right of common claimed, and against the validity of the inclosures. Many of them had been transferred to third parties for substantial sums; further proceedings were necessary to adjust rights and to temper the severity of the blow which had fallen on those who were under the impression they had made a good speculation in land. A special arbitrator (Sir Arthur, now Lord, Hobhouse) was appointed, who made his final award on the 24th of July, 1882; and on the 6th May, 1882,[61] the Queen in person declared Epping Forest open to the people. The following figures, taken from the arbitration proceedings, may be of interest in connection with the most trenchant assertion of the public interests in open land which has probably ever been witnessed.

	a.	r.	p.
Area of Epping Forest, including all land inclosed within twenty years before 21st August, 1871.....	5,928	2	33
Of this about half had been inclosed during the period mentioned.			
Houses, gardens, and curtilages quieted in title under Epping Forest Act, 1878.....	532	–	–
	5,396	2	33
Balance received by Corporation of London on certain exchanges of forest for other land	134	–	–
	5,530	2	33

[61] This day is unfortunately memorable from the terrible murder of Lord Frederick Cavendish and Mr. Burke at Dublin.

Expenditure of Corporation—	£
Litigation and other expenses preliminary to passing of Epping Forest Act, 1878	33,489
Purchase money and incidental expenses	189,012
Extinguishment of fuel rights	21,822
,, ,, minor rights	1,100
Shorthand notes and printing before Arbitrator	2,951
	248,374

XI.—*Parks and Gardens in Towns.*

We have seen that the open space movement which originated in a desire to protect suburban commons was extended by Mr. Fawcett to rural commons. Some years later the scope of the movement was enlarged on another side. Miss Octavia Hill in the year 1875 made a vigorous effort to save from the builder certain fields in the neighbourhood of the Swiss Cottage in the Finchley Road. Her work amongst the poor had convinced her of the supreme importance to their health and comfort of open spaces near their doors, and she found that the fields which she endeavoured to rescue were accessible to women and children, who found Hampstead Heath too remote for habitual use. In this particular case Miss Hill's efforts were unsuccessful, the land-owner and builder refusing to give time for the collection of the necessary purchase money. But the incident brought Miss Hill into the ranks of the Commons Preservation Society, which has ever since found in her one of its most active and resolute members. At Miss Hill's instance, also, a second society (the Kyrle Society) was formed with the express object of brightening in every practicable way the homes of the poor; and the protection and improvement of such small open spaces as disused churchyards and square gardens was made the special care of a committee of this body. From this committee in time developed Lord Meath's Metropolitan Public Gardens Association.

The work of this wing of the open space movement has been very noteworthy. Not only have a multitude of small gardens, already of a quasi public character, been saved from neglect and probable appropriation, but several large areas undoubtedly free for building, have been purchased at considerable sums and dedicated to the public. This result has been facilitated by the happy accident, that, in 1883, Mr. Bryce succeeded in passing through parliament an Act for the utilization of the City of London Parochial Charities. The revenues of these charities, amounting to something like 120,000*l.* a year, if my memory serves, had been previously squandered in giving help where no help was wanted, and maintaining churches to which no one went. The

Charities were handed over for re-organisation to the Charity Commissioners, and one of the objects to which the revenue was to be applied was the provision of open spaces. The Charity Commissioners devoted the bulk of the funds to the formation of polytechnics; but they asssisted by substantial contributions in the purchase of several open spaces.

I give in a table the additions to the parks and gardens of London acquired in this way, with the mode in which the funds were raised.[62] It is sufficient to mention here, by way of example, the great extension of Hampstead Heath (at a total expense of 300,000*l.*) through the purchase of Parliament Hill and the adjacent meadow land belonging to Lord Mansfield and Sir Spencer Wilson, the preservation of Clissold Park, Stoke Newington, Vauxhall Park, South Lambeth, Ravenscourt Park, Fulham, Brockwell Park, South Norwood, the Poors' Land, Bethnal Green, the Gravel Pit Wood and Waterlow Park, Highgate, and the Hilly Fields, Lewisham.

In the meantime the original work of the Commons Preservation Society, the preservation of metropolitan commons, has been by no means neglected. It has always been felt, that it was not enough in the case of these commons to protect them from arbitrary inclosure, but that it was also necessary to place them under definite local management. The Metropolitan Commons Acts, as we have seen, afforded the means of doing this, and fortunately the old Metropolitan Board of Works, which was by no means forward to resist the extravagant claims of Lords of Manors, showed itself very ready to assume control over any open space. The first application of the Metropolitan Commons Act to any common took place in 1869, when Hayes Common in Kent was placed under the management of local conservators. Two years later the Metropolitan Board of Works took charge of Blackheath and of Shepherds Bush Common, and during the next twelve years, nine commons or groups of commons were placed in the care of the Board, while other open spaces, lying outside the present county of London, though within the Metropolitan Police District, were placed under the management of district boards or local conservators. In all, twenty commons, or groups of commons, comprising about 3,840 acres, have been brought under local management by means of the Metropolitan Commons Act. Other London commons have been similarly dealt with by special Acts; amongst them may be mentioned Hampstead Heath, Wandsworth Common, Wimbledon and Putney Commons, Plumstead Common, and Tooting Graveney Common, extending together to about 1,570

[62] See Table II.

acres. Outside London the famous Malvern Hills, comprising 5,000 acres of open land have also been placed under local management by means of a special Act of Parliament.

XII.—*General Results of Open Space Movement.*

There are other phases and results of the open space movement at which I can only just glance. Prior to 1865 it was the habit of railway companies and other persons anxious to construct works by means of Parliamentary powers to take as much common land for the purpose as opportunity offered. The land was very cheap, and there was practically no one to object to its appropriation. The lord of the manor was the only person who obtained substantial compensation, and he was only too glad to turn a barren inheritance into money. The commoners, who were often grievously injured, could only object under difficult conditions, and the public, who lost an open space, could not object at all. Consequently not only in rural districts, but on the edge of London, commons were sliced to pieces by railway lines. One of the earliest actions of the Commons Preservation Society was to challenge railway Bills which offended in this way in the House of Commons; and with such signal success has this policy been pursued, that commons are now rather avoided than sought, and the Society is looked upon by railway promoters as the recognised champion of public interests, to be propitiated, if possible. On the average of the last five years the society has examined annually no less than 25 Parliamentary Bills affecting open spaces, and has either stopped or introduced important conditions into all such as have seriously threatened the public interests.

Again, the importance of small gardens in towns has led to an alliance with the Ancient Buildings Protection Society and other bodies of a like aim, in a stout defence of many a fragment of old London—some venerable and interesting building standing amid charming lawns. Notable successes in this direction are the preservation of the historic buildings and pretty gardens of the Charterhouse and (very recently) of the Trinity Almshouses, Mile End. By degrees also the open space movement has extended itself to beautiful spots and tracts of land, not necessarily in the nature of commons,—to such work as the defence of the Lake District from needless disfigurement by railways, and the purchase of some of the more notable features of our country. A very striking instance of the growing sensitiveness of public opinion to the importance of protecting natural beauty, is afforded by the recent arrest, on the motion of Mr. Bryce, of a Scotch Railway Bill at a late stage, on the charge of inflicting wanton injury on a lovely highland glen. However, these are matters which do not

easily lend themselves to statistics. Let me return, before concluding, to parks, gardens, and commons, and see how far it is possible to sum up what has been done.

I have been at some pains to obtain the best information as to commons and parks actually secured to the public during recent years both in London and in the provincial towns.

In the case of the County of London my figures are obtained mainly from a recent Report on the subject of open spaces issued by the London County Council; in the case of the Metropolitan Police District outside the county of London, or, to use a shorter phrase, "Greater London," I have consulted various sources of information, and have been greatly assisted by the list which appears annually in the Report of the Metropolitan Public Gardens Association. It is impossible to say that the particulars I have obtained are accurate to a few acres or a few pounds, but I believe they are substantially correct.

In the county of London[63] then, 2,162 acres of common land have since 1865 been definitely secured to the public either by schemes under the Metropolitan Commons Acts, or by special Acts. Omitting legal expenses and expenses of laying out, the total cost of purchasing this area is nearly 270,000*l.*, or an average of nearly 125*l.* per acre. Within the same area and during the same period[64] parks and gardens have been purchased or acquired by gift, or formed from disused burial grounds and from square gardens, to an extent of 1,654 acres, the price paid being a little over 1,313,000*l.*, or an average payment of 793*l.* per acre.

In Greater London (excluding the county), commons to the extent of 4,297 acres have been acquired for 43,600*l.*, or a little more than 10*l.* an acre. To this total must be added 5,531 acres rescued from Epping Forest at a total cost for purchase money and incidental expenses (not including the cost of litigation and of abolishing certain common rights) of 189,012*l.*, or an average cost of 34*l.* an acre. Adding Epping Forest to the other commons acquired in Greater London, we have a total acreage of 9,828 acres acquired for just under 230,000*l.*, or about 23*l.* per acre. Turning to parks and gardens, 466 acres have been secured for the sum of 87,600*l.*, or about 188*l.* an acre. These figures show in a very striking way the great saving to the public which has arisen from the arrest of the movement for inclosure, and the rescue from its effects of so many commons in the neighbourhood of London. It cannot be doubted, that if Finchley Heath, the state of which as an open

[63] For the particulars of the commons and parks secured and of the expenses incurred, see Table II.

[64] The Act for the formation of Southwark Park was passed in 1864, but the park of course was not opened to the public till some time later.

waste was so picturesquely described and deeply regretted at the end of the last century, had been left in its wild condition, the ratepayers of London would have been saved some of the large items of expenditure which they have incurred in providing parks and open spaces on the north of London, and the sum of 1,300,000*l.* which I have mentioned would have been largely reduced.

To complete the tale of open spaces enjoyed by London, one must add the area of the Royal Parks, which, of course, were in existence long prior to the open space movement, but many parts of which have nevertheless been opened to the public during recent years, and the whole of which have been made far more enjoyable, under the influence doubtless of the prevailing feeling for open spaces. Within the county of London these extend to 1,249 acres, making the total area of open space within the county 5,065 acres. Outside the county the large expanse of Richmond Park, together with Bushey Park and Hampton Court, constitute an addition of 3,639 acres, thus making in all about 14,000 acres of open land.

The population of the county in 1896 was 4,433,000, thus giving 1 acre of open space to every 875 persons. The population of the outside ring was, in 1891, 1,422,000, giving about 1 acre to each 100 persons. If this population is added to the population of the county in 1896, we have 5,855,000 as the population of the whole of greater London; and in this district there are 308 persons to each acre of open space.

The distribution of the open spaces is not, of course, equal throughout the district. Speaking generally it will be found that the western half of London is far better supplied than the eastern, although great efforts have been made during the last ten years to add to the advantages in this respect of East London, both south and north of the Thames. At this moment an effort is being made to add another 50 acres to the secured open spaces in the shape of Churchyard Bottom Wood, Highgate, a wood which for practical purposes belongs to the north-east section of London.

To obtain information as to the area of land, in the shape of commons, parks, and gardens, which has been secured to the public by the provincial towns of England and Wales during the present reign, I addressed a circular to the town clerks of all boroughs of more than 6,000 inhabitants, that limit of population being selected in the Commons Act of 1876 as denoting a town, commons in the neighbourhood of which are to be considered suburban. I divided these towns into three classes, those of 50,000 inhabitants and upwards, those of between 10,000 and 50,000 inhabitants, and those of between 6,000 and 10,000 inhabitants. Excluding London,

there are 55 towns of 50,000 inhabitants and upwards, and from these I received forty-two replies. These answers show that in the 42 towns in question over 2,000 acres of common land have been secured, either by the operation of regulation schemes under the Commons Act, 1876, by purchase or otherwise, while nearly 5,500 acres of parks and recreation ground have been provided. Adding these figures together we have a total of about 7,500 acres. The aggregate population of the 42 towns in question is 4,423,000, thus giving 1 acre of open space to every 583 persons.[65]

There are 135 towns of more than 10,000 and less than 50,000 inhabitants. Of these only 82 have furnished information in answer to my circular; the result is to show an area of 4,388 acres of common and 2,035 acres of park and recreation ground secured. The total of these two areas is 6,423 acres, and the aggregate population of the towns in question is 2,162,000, thus giving 1 acre of open space to every 336 persons.

Of the towns between 6,000 and 10,000 inhabitants, 22 out of 33 have replied to my circular, and the result is to show an area of 593 acres of common land and 92 acres of park and recreation ground. The total of these two areas is 685 acres, and the aggregate population of the towns in question is 153,934, thus giving 1 acre of open space to every 224 persons.

To sum up the whole of these figures (leaving out for this purpose the royal parks) we have as the sum total of the movement in favour of open spaces which has taken place during the present reign, and especially during the last half of it, the following figures:—

	Acres.
County of London	3,816
Greater London	10,294
145 provincial towns	14,687
Total	28,797

The total area of common land placed under regulation is, as we have seen, 31,081 acres. If we assume that the whole of the commons secured by provincial towns are included in this figure, there still remain 24,000 acres of common land placed under regulation and thus secured to the public, either in the neighbourhood of the towns which have made no returns or in rural districts. We thus have, in all, over 52,000 acres of common, park, and garden preserved.[66]

[65] For particulars of the several classes of towns and the area of open spaces secured in each, see Table III.

[66] I must express my acknowledgments to several friends, and particularly to Mr. J. Okell of the Post Office, for their kind aid in checking the several figures given in this Paper

It would be interesting to consider the relation of the tables of mortality to the provision of open spaces in the several towns from which particulars have been obtained, but any such attempt would be beyond the scope of the present Paper. It will at least be conceded, that a very potent factor in the maintenance of the health—not only of the bodily, but of the mental, I might almost say the spiritual, health—of the town population of the country has been brought to bear through the efforts of those who have for the last thirty years striven to preserve the remaining commons of the country, and to provide parks and gardens, where no commons are now available.

TABLE I.—*Progress of Inclosure in Different Periods, in Groups of Counties.*

	Eighteenth Century.		1800–42.		1845–69.		Totals.	
NORTHERN.								
A.—Northumberland...	30		20		17		67	
Cumberland	18		63		29		110	
Durham	26		13		2		41	
Westmoreland	13		32		33		78	
		87		128		81		296
B.—Lancashire	28		33		15		76	
Yorkshire	315		232		62		609	
Lincoln	172		90		15		277	
		515		355		92		962
EAST ANGLIA.								
Norfolk	53		200		29		282	
Suffolk	8		64		27		99	
Essex	3		34		29		66	
		64		298		85		447
MIDLANDS.								
Beds	31		42		4		77	
Cambs.....	7		88		10		105	
Hunts	27		28		5		60	
Leicestershire.....	135		14		–		149	
Warwickshire.....	69		37		12		118	
Northants	127		53		16		196	
Oxford	67		49		39		155	
Rutland	18		2		3		23	
		481		313		89		883
Notts	79		33		4		116	
Stafford	38		43		10		91	
		117		76		14		207
HOME COUNTIES.								
Hertford.....	9		19		29		57	
Middlesex	5		22		3		30	
Surrey.....	3		38		21		62	
Kent	–		15		15		30	
Sussex.....	4		32		32		68	
		21		126		100		247
Wilts	54		82		19		155	
Dorset.....	14		48		22		84	
		68		130		41		239
Devon	–		26		41		67	
Cornwall.....	–		2		15		17	
		0		28		56		84
Cheshire		12		24		14		50
Derbyshire		74		51		7		132
Berks	27		63		20		110	
Bucks	53		43		15		111	
Hants	35		47		60		142	
		115		153		95		363
Monmouth	–		3		8		11	
Gloucester	74		63		22		159	
Worcester	62		47		15		124	
Hereford.....	7		34		18		59	
Salop	18		26		10		54	
		161		173		73		407
Somerset.....		45		60		21		126
Wales		15		82		82		179
		1,775		1,997		850		4,622

TABLE II.—*Commons, Parks, and Gardens secured to Public in London.*

A. *County of London:*

I. COMMONS.

N.E. District.

Name.	When and how Secured.	Cost, and when not found wholly by County Council, how made up.			Area.	
				£	A.	R.
Hackney Downs	1872. Under Metropolitan Commons Supplemental Act, 1872	The lord's interest was purchased subsequently to the Act for Local Management for		90,000	41	3
London Fields					26	2
Well Street Common					20	3
South Hackney Common					—	
South Mill Field					34	2
North „ „					23	1
Clapton Common					7	2
Stoke Newington Common					5	1
Hackney Marshes	London Open Spaces Act, 1893		£		337	–
		County Council	50,000	—		
		Hackney Vestry	25,000	—		
				75,000		
				165,000	496	2

S.W. District.

				£		
Wandsworth Common	Wandsworth Common Act, 1871	A perpetual annuity to Earl Spencer of 250*l.*, say		7,000	183	–
Clapham „	1877. Under Metropolitan Commons Supplemental Act, 1877			18,000	220	–
Tooting Beck	1873. Metropolitan Commons Supplemental Act, 1873			17,771	144	–
„ Graveney	Metropolitan Board of Works (General Powers) Act, 1875			—	63	–
Streatham Green	1873. Under Metropolitan Commons Supplemental Act, 1873			—	1	–
„ Common	1884. Under Metropolitan Commons Supplemental Act, 1884	Acquired from Ecclesiastical Commissioners for nominal sum of		5	66	–
				42,776	677	–

TABLE II—*Contd.* *Commons, Parks, and Gardens secured to Public in London.*

A. *County of London.*

I. COMMONS—*Contd.*

S.E. District.

Name.	When and how Secured.	Cost, and when not found wholly by County Council, how made up.			Area.	
				£	A.	R.
Peckham Rye Goose Green Nunhead Green	1882. Private Act			1,000	64 6 1	– 1 2
Blackheath	1871. Under Metropolitan Commons Supplemental Act, 1871	No payment			267	–
Plumstead Common	1878. Private Act	Met. Board of Works War Office	£ 6,000 4,000	10,000	100	–
Bostal Heath	1877. Under Metropolitan Commons Supplemental Act, 1877			5,000	55	–
Shoulder of Mutton Green*	1878. Private Act			500	5	–
				16,500	498	3

N.W. District.

Brook Green Eelbrook Common Walham Green Parsons „	1881. Under Metropolitan Commons Supplemental Act, 1881	No payment			27	–†
Shepherd's Bush Common	1871. Metropolitan Commons Second Supplemental Act, 1871			£ 505	8	–
Wormwood Scrubs	This common was acquired by the War Office for 52,615*l.*, and is used by the public, subject to military exigencies			—	193	–
Little Scrubs	1886. Private Act			—	22	–
Hampstead Heath	Hampstead Heath Act, 1871			45,000	240	–
				45,505	490	–

* Outside County of London.

† The County Council "Report" gives the acreage of this group of commons at 21a. 2r. only.

TABLE II.—*Contd.* *Commons, Parks, and Gardens secured to Public in London.*

A. *County of London.*

II. PARKS AND GARDENS.

N.E. District.

Name.	When and how Secured.	Cost, and when not found wholly by County Council, how made up.		Area.	
				A.	R.
Victoria Park, Bethnal Green Gardens, comprising—Museum Gardens	London Parks and Works Act, 1887	Transferred from Government to County Council without charge		244	–
				2	2
Bethnal Green Poor's Land; West Meadow	1893. By purchase		£ 6,000	6	2
Finsbury Park	Finsbury Park Act, 1869		£ 136,304	115	–
Clissold Park, Stoke Newington	1889. By purchase	Met. Board 25,000; Charity Com. 47,500; Ves. of Stoke Newington 10,000; S. Hornsey Local Board 6,000; Hackney Dis. Board 5,000; Vestry of Islington 2,500	96,000	53	–
Highbury Fields	Private Act	Met. Board 30,000; Vestry of Islington 30,000	60,000	25	2
Highbury Fields	1891. Purchase	—		2	–
Canonbury Square	1888. Under control of Islington Vestry	—		1	–
Barnsbury ,,	1889. Under control of Islington Vestry	—		1	2
Thornhill Gardens, and several other small open spaces in Islington	Under control of Islington Vestry	—		5	–
Cattle Market, Holloway, part of site of	1896. Purchased by Vestry		16,000	5	2
Meath Gardens (formerly Victoria Park Cemetery)	1894		1,005	9	2
Shandy Street Recreation Ground		Nominal ground rent to Beaumont Trustees		1	2
Carlton Square Gardens	Squares, gardens, or disused burial grounds acquired or managed under Open Spaces Acts, 1887 to 1892	—		–	3
Holy Trinity Churchyard, Mile End				1	1
Limehouse Churchyard				3	–
Stepney ,,				7	–
St. Bartholomew's Gardens, Bethnal Green				1	–
St. Paul's Churchyard, Shadwell				1	–
			315,309	486	2

TABLE II—*Contd.* *Commons, Parks, and Gardens secured to Public in London.*

A. *County of London.*

II. PARKS AND GARDENS—*Contd.*

N.E. District—Contd.

Name.	When and how Secured.	Cost, and when not found wholly by County Council, how made up.		Area.	
			£	A.	R.
		Brought forward....	315,309	486	2
Wapping Recreation Ground	Cleared under Artizans Dwellings Act		52,000	2	2
Winthrop Street Play Ground	—	—		—	2
			£		
Isle of Dogs Recreation Ground	—	London C.C. 5,200 Poplar Dist. Board of W. 3,500	8,700	3	—
Goldsmith's Square Recreation Ground, Shoreditch	—	London C.C. 2,450 Shoreditch Vestry 2,000	4,450	—	3
Poplar Recreation Ground	1867. Under control of Poplar District Board of Works	Met. Board of Works 4,000 Poplar Dist. Board of W. 5,500	9,500	2	3
Stepney Green	1872. Under control of Vestry of Mile End Old Town	—		2	2
Goldsmith's Square Shoreditch	1893. Under control of Shoreditch Vestry		4,500	—	2
Tower Gardens	1888. Use by public temporarily allowed....	—		2	—
St. Thomas's Square, Mare Street	Under control of Hackney District Board of Works	—		1	—
			394,459	502	—

S.W. District.

Battersea Park	London Parks and Works Act, 1887	Transferred by Government without payment		198	—
Shrubberies and Chelsea Embankment Gardens	—	—		—	
			£		
Brockwell Park	1892. Private Act	London C. C. 61,000 Charity Com. 25,000 Eccles. ,, 500 Vestry of Lambeth 20,000 Vestry of Newington 5,000 Vestry of Camberwell 6,000 Private subscriptions 1,757	119,257	78	—
				276	—

TABLE II—*Contd.* *Commons, Parks, and Gardens secured to Public in London.*

A. *County of London.*

II. PARKS AND GARDENS—*Contd.*

S.W. District—Contd.

Name.	When and how Secured.	Cost, and when not found wholly by County Council, how made up.		Area. A.	Area. R.
		Brought forward....	£119,257	276	–
Kennington Park	London Parks and Works Act, 1887	Transfer from government. No payment		19	2
Myatt's Fields, Camberwell	—	Given to London County Council through Metropolitan Gardens Association		14	2
Lincoln's Inn Fields	London County Council Improvement Act, 1894		£12,000	7	–
Bishop's Park, Fulham	1893. Vested in Vestry of Fulham	Given by Bishop of London and Ecclesiastical Commissioners		12	–
Fulham Palace Recreation Ground		London C. C. Vestry of Fulham	£ 11,250	9	–
			142,507	338	–

S.E. District.

Dulwich Park	Metropolitan Board of Works (Various Powers) Act, 1855	Given by Dulwich College		72	–
Peckham Rye extension	London Council (General Powers) Act, 1891		£	49	–
		London C. C.	18,000		
		Charity Com.	12,000		
		Ves. of Camberwell	20,000		
		Private donations	925		
			50,925		
Lewisham (Ladywell) Recreation Ground	Metropolitan Board of Works (Various Powers) Act, 1888	London C. C.	10,940	47	–
		Lewisham Dis. Board	10,940		
			21,880		
Southwark Park	Southwark Park Act, 1864	(Including laying out)	121,707	63	–
Bostal Heath extension	Metropolitan Board of Works (Various Powers) Act, 1887	Met. Board of Works	2,232	16	–
		Plumstead Dis. Board	1,118		
			3,350		
Bostal Woods	London Council (General Powers) Act, 1891	London C. C.	6,000	61	–
		Plumstead Dis. Board of Works	6,000		
			12,000		
			209,862	308	–

TABLE II—*Contd.* *Commons, Parks, and Gardens secured to Public in London.*

A. *County of London.*

II. PARKS AND GARDENS—*Contd.*

S.E. District—Contd.

Name.	When and how Secured.	Cost, and when not found wholly by County Council, how made up.	£	Area. A.	R.
			£ 209,862	308	–
Royal Victoria Gardens, North Woolwich	London Council (General Powers) Act, 1890	London C. C. 1,000 Charity Com. 10,000 East Ham Local Brd. 500 Private donations 8,000	19,500	10	–
Maryon Park, Charlton	London Council (General Powers) Act, 1891	Given by Sir Spencer Maryon Wilson		12	–
Telegraph Hill, Hatcham	1894. Open Spaces Acts, 1877-92	London C. C. 3,100 Mr. George Livesey .... 2,000 Greenwich Dis. Board 2,000 Haberdashers' Com. 2,000	9,100	9	2
St. Paul's Churchyard, Rotherhithe	Open Spaces Acts, 1877-92	—		1	–
Hilly Fields, Brockley (or Lewisham)	London Open Spaces Act, 1893	London C. C. 22,825 Greenwich Dis. Board 7,000 Lewisham Dis. Board 2,800 Lewisham Charities 1,000 London Parochial Charity Trustees 1,500 Private donations 6,093	41,218	41	–
Deptford Park	—	London C. C. 24,000 Other sources 12,000	36,000	22	–
Lea Recreation Ground	—	London C. C. 2,000 Other sources 4,400	6,400	8	–
Sydenham and Tulse Hill Recreation Ground	Purchased by Lewisham District Board of Works		8,500	17	2
Camberwell Green	Purchased by Camberwell Vestry		2,000	2	2
Ravensbourne Recreation Ground	1886. Under control of Greenwich District Board of Works	—		1	1
			332,580	432	3

TABLE II—*Contd.* *Commons, Parks, and Gardens secured to Public in London.*

A. *County of London.*

II. PARKS AND GARDENS—*Contd.*

N.W. District.

Name.	When and how Secured.	Cost, and when not found wholly by County Council, how made up.		Area.	
		£	£	A.	R.
Ravenscourt Park, Hammersmith	Metropolitan Board of Works (Various Powers) Act, 1887	Met. Board of Works 29,000 Ves. of Hammersmith 29,000	58,000	32	–
Hampstead Heath Extension	Hampstead Heath Enlargement Act, 1886	Met. Board of Works 150,000 Vestry of St. Pancras 30,000 Vestry of Hampstead 20,000 Vestry of Marylebone 5,000 Charity Com. 50,000 Private donations 46,000	301,000	265	–
Embankment Gardens	Thames Embankment Act	—		–	–
Leicester Square Garden	Leicester Square Act, 1874	Given by Baron Grant		14	–
Waterlow Park	London Council (General Powers) Act, 1890	„ Sir Sydney Waterlow		26	–
Russell Court Playground	—	—		–	1
Red Lion Square Garden	—	—		–	2
Spa Fields' Playground	—	—		1	3
Spa Green	—		10,000	1	3
Whitfield's Tabernacle Burial Ground	1894		5,000	–	2
Avondale Park, Pottery Lane Fields	1892. Purchased by Kensington Vestry, and under their control		9,200	4	1
Paddington Green	1864. Under control of Paddington Vestry	—		1	1
„ Recreation Ground	1893. Purchased by, and under control of Vestry	Vestry	50,000	25	–
Recreation Ground, Wendell Park, Starch Green	Under control of Hammersmith Vestry	Given by Ecclesiastical Commissioners		4	–
Great Church Lane Ground, Hammersmith	By purchase. Under control of Vestry of Hammersmith	London C.C. 800 Vestry 800	1,600	1	2
Fortune Green, Hampstead	Purchased by and under control of Vestry of Hampstead	London C.C. Vestry Private donations	8,000	2	2
West End Green, Hampstead	1885. Purchased by and under control of Vestry of Hampstead	Met. Board of Works Vestry Private donations	850	–	2
Playground, Upper Park Road, Haverstock Hill	1887. Under control of Vestry of Hampstead	—		–	2
			443,650	381	1

TABLE II—*Contd. Commons, Parks, and Gardens secured to Public in London.*

B. *Metropolitan Police District outside County of London.*

I. COMMONS SECURED TO PUBLIC.

Name.	When and how Secured.	Managing Body.	Cost, and how found.	Area.
				A. R.
Hayes Common, Kent	Metropolitan Commons Supplemental Act, 1869	Local Conservators	No cost	200 –
Barnes Common, Surrey	Metropolitan Commons Supplemental Act, 1876	Local Conservators	,,	120 –
Ealing Common	Metropolitan Commons Supplemental Act, 1877	Ealing Local Board	,,	50 –
Ealing Lammas Land	1888. By purchase	Ealing Local Board	,,	24 –
Staines Moor	Metropolitan Commons Supplemental Act, 1880	Staines Local Board	,,	353 –
Acton Common	Metropolitan Commons Supplemental Act, 1882	Acton Local Board	,,	12 –
Chiswick Common, Turnham Green	Metropolitan Commons Supplemental Act, 1882	Chiswick Local Board	,,	21 –
Tottenham Common	Metropolitan Commons Supplemental Act, 1882	Tottenham Local Board	,,	48 –
Chislehurst Common (with St. Paul's Cray)	Metropolitan Commons Supplemental Act, 1886	Local Conservators	,,	182 –
Farnborough Common	Metropolitan Commons Supplemental Act, 1886	Local Conservators	,,	45 –
Mitcham Common	Metropolitan Commons Supplemental Act, 1891	Local Conservators	,,	570 –
Banstead Commons	Metropolitan Commons Supplemental Act, 1893	Local Conservators	,,	1,300 –
Wimbledon Common	Wimbledon and Putney Commons Act, 1871	Local Conservators	A Perpetual Annuity to Lord of Manor of 1,200*l.* secured on rates: say £ 33,600	1,000 –
				3,925 –

TABLE II—*Contd. Commons, Parks, and Gardens secured to Public in London.*

B. *Metropolitan Police District outside County of London.*

I. COMMONS SECURED TO PUBLIC—*Contd.*

Name.	When and how Secured.	Managing Body.	Cost, and how found.			Area.
					£	A. R.
Coulsdon Commons	About 1878-79. Under Corporation of London (Open Spaces) Act, 1878	Corporation of London	Brought forward		33,600	3,925 –
			Corporation of London		7,000	346 3
West Wickham Common	1892. Under Corporation of London (Open Spaces) Act, 1878	Corporation of London	Corporation of London	—		25 –
			Private subscribers	—		
					3,000	
					43,600	4,296 3

II. PARKS AND GARDENS.

Hermit Road Recreation Ground, Plaistow	1896	West Ham Corporation.....	City of London Parochial Charity Trustees			10 –
			Metropolitan Public Gardens Association	350		
			Private donations ..			
					8,000	
West Ham Park	1874. Purchased and managed by Joint Committee of Corporation and local gentlemen	—	Corporation of London	10,000		80 –
			Owners	10,000		
			Private donations	5,000		
					25,000	
Wanstead Park	1882. Under Corporation of London (Open Spaces) Act, 1878.....	—	Corporation of London		8,000	182 –
Higham Park	1891. Under Corporation of London (Open Spaces) Act, 1878.....	—	Corporation of London		6,000	30 –
Highgate Woods (Gravel Pit)	1886. Under Corporation of London (Open Spaces) Act, 1878.....	—	Given by Ecclesiastical Commissioners			70 –
					47,000	372 –

TABLE II—*Contd. Commons, Parks, and Gardens secured to Public in London.*

B. *Metropolitan Police District outside County of London.*

II. PARKS AND GARDENS—*Contd.*

Name.	When and how Secured.	Managing Body.	Cost, and how found.		Area.
				£	A. R.
Roundwood Park, Harlesden	1895. Purchased by Willesden District Council	—	Brought forward	47,000	372 –
			Willesden District Council	15,000	27 –
Home Field, Chiswick Lane	1896. Purchased by Chiswick District Council	—		4,600	10 –
Kilburn Park	1887. Under Corporation of London (Open Spaces) Act, 1878	—	Corporation of London	3,000	30 –
Acton Recreation Ground	1889. Purchased by and under control of Acton District Council	—	Goldsmiths' Co. £5,000		
			District Council £13,000		
				18,000	25 –
South Acton Recreation Ground	1892. Under control of Acton District Council	—		—	2 –
				87,600	466 –

C. *Royal Parks.*

	County of London.	Greater London.
	Acres.	Acres.
Hyde Park	350	—
Kensington Gardens	270	—
Green Park	53	—
St. James's Park	91	—
Greenwich „	148	—
Richmond „	—	2,050
Bushey „	—	680
Hampton Court Gardens	—	36
„ Park*	—	630
Regent's Park	275	—
Primrose Hill	62	—
Kew Gardens	—	243
	1,249	3,639

* Opened 1893.

Summary.

County of London.

	N.E. District.		S.W. District.	
	Acreage.	Price.	Acreage.	Price.
	A. R.	£	A.	£
I. Commons	496 2	165,000	677	42,776
II. Parks and gardens	502 –	394,459	338	142,507
Totals	998 2	559,459	1,015	185,283
III. Royal parks	—	—	—	—

	S.E. District.		N.W. District.		Totals.	
	Acreage.	Price.	Acreage.	Price.	Acreage.	Price.
	A. R.	£	A. R.	£	A. R.	£
I. Commons	498 3	16,500	490 –	45,505	2,162 1	269,781
II. Parks and gardens	432 3	332,580	381 1	443,650	1,654 –	1,313,196
Totals	931 2	349,080	871 1	489,155	3,816 1	1,582,977
III. Royal parks	—	—	—	—	1,249 –	—
	—	—	—	—	5,065 1	1,582,977

Greater London.

	Acreage.		Price.	
	A. R.	A. R.	£	£
I. (A) Commons	4,296 3		43,600	
(B) Epping Forest	5,531 –		189,012	
II. Parks and gardens	436 –		87,600	
		10,293 3		
III. Royal parks		3,639 –		320,212
		13,932 3		320,212

Totals.

	Acreage.	Price.
	A. R.	£
County of London	5,065 1	1,582,977
Greater London	13,932 3	320,212
Totals	18,998 –	1,903,189

TABLE III.—*Statistics of Provincial Open Spaces.*

I.—*Cities and Towns of 50,000 Inhabitants and upwards (Fifty-five in number).**

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Town to 1 Acre of Open Space.	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. R.		A. R.		A. R.	A.			
Barrow-in-Furness	51,712	10,987	1 recreation ground	35 –	—	—	—	35 –	313	1,477	4	
Birkenhead	99,857	3,849	2 parks.....	141 –	2 commons	69 –	Partly controlled by Corporation	210 –	18	475	25	There is a further recreation ground, acreage not stated. 36 further acres of common in negotiation.
Birmingham.....	478,113	12,705	14 parks and gardens	266 –	Rednall and Bilberry Hills	82 2	Acquired by Corporation	348 2	36	1,371	37	
Bolton	115,002	2,357	7 parks and recreation grounds	83 3	Not stated	—	—	83 3	28	1,373	49	
Bradford	216,361	10,791	5 parks.....	216 3	None.....	—	—	216 3	49	998	20	
Brighton	116,817	2,529	5 parks and recreation grounds	102 3	Common land.....	241 –	Acquired by Corporation	343 3	7	339	46	
Burnley	87,016	3,923	12 parks and recreation grounds	112 2	No commons	—	—	112 2	34	773	22	Corporation have contracted to buy 62 acres, subject to certain consents.
Croydon.....	102,695	9,012	11 recreation grounds	209 2	—	—	—	209 2	43	490	11	Corporation represented on Board of Mitcham Common, and contribute to keep up common.
Derby	94,146	3,450	5 recreation grounds	51 2	Chester Green ...	Not stated	Acquired by Corporation	51 2	67	1,828	27	

* Thirteen towns made no return.

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

I.—*Cities and Towns of* 50,000 *Inhabitants and upwards (Fifty-five in number)—Contd.*

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Town to 1 Acre of Open Space.	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. R.		A. R.		A. R.	A.			
Devonport	54,803	1,760	3 parks and recreation grounds	57 3	None	—	—	57 3	30	949	31	Also certain slopes rented from War Office.
Gateshead	85,692	3,138	3 parks and recreation grounds	66 –	None	—	—	66 –	47	1,298	27	
Hastings	52,223	1,822	6 parks, &c.	191 2	None	—	—	191 2	9	272	28	Some of open spaces leasehold.
Halifax	89,832	8,530	4 parks, &c.	51 –	Formed into 2 parks	82 1	Acquired by Corporation	133 1	64	674	10	
Hanley	54,946	1,768	4 parks, &c.	110 –	None	—	—	110 –	16	499	31	
Huddersfield	95,420	11,852	4 parks, 6 recreation grounds	82 –	—	—	—	82 –	144	1,163	8	
Hull	200,044	8,226	3 parks, 2 recreation grounds	131 1	None	—	—	131 1	62	1,524	24	Supposed common at Marfleet of 32 acres.
Ipswich	57,360	8,110	Park	69 –	None	—	—	69 –	117	831	7	
Leeds	367,505	21,572	2 parks, 14 recreation grounds	504 –	Woodhouse Moor, Huntslet Moor	96 –	Acquired by Corporation	600 –	35	612	17	
Leicester	174,624	8,586	8 parks, &c.	224 1	None	—	—	224 1	38	778	20	
Liverpool	517,980	15,252	5 parks, 2 recreation grounds	853 2	—	—	—	853 2	18	607	34	These open spaces cost the Corporation 789,651*l.* The Corporation has also purchased the reversion to Prince's Park, containing 50 acres, for 11,000*l.*
Middlesbrough	75,932	2,824	1 park	74 –	Not stated	—	—	74 –	38	1,026	26	

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

I.—*Cities and Towns of 50,000 Inhabitants and upwards (Fifty-five in number)—Contd.*

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Town to 1 Acre of Open Space.	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. R.		A.		A. R.	A.			
Newport (Mon.)	54,707	4,463	4 parks	48 –	None	—	—	48 –	93	1,139	12	
Nottingham	213,877	10,935	8 parks, &c., and 7 recreation walks	157 2	Bulwell Forest	135	Acquired by Corporation	292 2	37	730	19	
Norwich	61,096	6,920	Gildencroft	4 –	Chapel Fields	7	Purchased by Corporation	195 –	35	303	8	
					Mousehold Heath	184	Given to Corporation and under regulation					
Oldham	131,463	4,730	1 park	70 –	Not stated	—	—	70 –	67	1,878	27	Other recreation grounds—acreage not stated
Plymouth	84,248	1,540	3 parks, &c.	35 –	None	—	—	35 –	44	2,407	54	Also Plymouth Hoe.
Reading	60,054	5,878	5 parks, &c.	92 1	—	—	—	92 1	63	651	10	
Rochdale	71,401	4,185	Parks, &c.	15 2	Cronkeyshaw Common	43	Acquired by Corporation	58 2	71	1,220	17	
St. Helen's	71,288	6,586	3 parks	101 –	—	—	—	101 –	65	705	10	
Salford	198,139	5,171	4 parks 16 recreation grounds	101 2	Kersal Moor	211	Acquired by Corporation	123 –	42	1,610	38	
Sheffield	324,243	19,651	13 parks, &c.	293 –	None	—	—	293 –	67	1,106	16	
Southampton	65,325	2,004	Parks, &c.	75 –	Commons	365	Managed by Corporation	440 –	4·5	148	32	
Sunderland	131,015	2,868	6 parks	61 2	—	—	—	61 2	46	2,130	45	Town Moor and Tunstall Hills near town — acreage not stated.
South Shields	78,391	1,839	2 parks	76 1	Sands and sea shore	100	—	176 1	10	444	42	
Swansea	90,349	5,087	9 parks, &c.	99 1	None	—	—	99 1	51	910	17	Considerable common land not secured.

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

I.—*Cities and Towns of* 50,000 *Inhabitants and Upwards* (*Fifty-five in number*).

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Town to 1 Acre of Open Space.	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. R.		A.		A. R.	A.			
Stockport	70,263	2,200	5 parks, &c.	62 –	Not stated	—	—	62 –	35	1,133	32	
Walsall	71,789	7,480	2 parks, 1 recreation ground	42 –	3 pieces of common land	60	—	102 –	73	703	9	
Warrington	52,743	1,975	2 parks. 3 recreation grounds	76 2	—	—	—	76 2	25	689	26	—
West Ham.....	204,903	4,706	4 parks, &c.....	119 –	—	—	—	119 –	39	1,721	43	—
Wigan	55,013	2,188	1 park	29 –	—	—	—	29 –	75	1,897	25	Small portion of Wanstead Flats, in parish, acquired by Corporation of London as part of Epping Forest. In adjoining district of Ince-in-Makerfield, part of common has been laid out as park.
Wolverhampton	82,662	3,525	2 parks	101 –	—	—	—	101 –	34	818	23	—
York	66,912	3,584	None	– –	Large commons belonging to freemen	800	Managed by pasture masters annually elected by freemen	800 –	4	83	18	Corporation considering question of acquiring commons.

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

II.—*Towns of* 10,000 *and under* 50,000 *Inhabitants* (*One Hundred and Thirty-five in number*).*

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Town to 1 Acre of Open Space.	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. R.		A.		A. R.	A.			
Accrington	38,603	3,425	2 parks.....	19 1	None	—	—	19 1	180	2,032	11	There are two large recreation grounds on short lease. Acreage not stated.
Bacup	23,498	6,116	2 recreation grounds	8 –	—	—	—	8 –	764	2,937	4	
Banbury	12,768	4,634	1 recreation ground	14 –	—	—	—	14 –	331	912	3	
Barnsley	35, 27	2,386	1 park	40 –	—	—	—	40 –	59	885	16	
Beverley	12,539	2,404	None	—	3 common pastures	1,174	Freehold in corporation	1,174 –	2	12	6	
Bootle	49,217	1,595	1 park, 3 recreation grounds	55 3	—	—	—	55 3	29	894	31	
Boston	14,593	2,765	1 park	6 2	—	—	—	6 2	400	2,432	6	
Bournemouth ...	37,781	2,415	1 park, &c. (leasehold)	143 –	Turf commons ...	30	Subject of Bill before Parliament	173 –	14	218	15	13 acres (continuation of one pleasure ground) is private, but open to public.
Bridgwater	12,436	717	1 recreation ground	10 –	—	—	—	10 –	71	1,243	18	
Brighouse	20,666	2,224	1 park, 3 recreation grounds	16 2	—	—	—	16 2	139	1,291	9	
Burslem	31,999	1,861	1 park	23 –	—	—	—	23 –	81	1,391	16	
Burton-on-Trent	46,047	4,207	6 recreation grounds	64 –	—	—	—	64 –	65	719	11	
Bury St. Edmunds	16,630	2,947	None.....	—	—	—	—	—	—	—	—	
Cambridge	36,986	3,233	2 gardens.....	11 2	—	—	—	11 2	293	3,362	11	Various commons of ample space. No particulars given.
Chatham	31,657	4,336	2 recreation grounds	33 3	—	—	—	33 3	131	959	7	Both grounds leasehold; one of War Office.

* Fifty-three towns made no return.

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

II.—*Towns of* 10,000 *and under* 50,000 *Inhabitants* (*One Hundred and Thirty-five in number*)—*Contd.*

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds. Particulars.	Parks or Recreation Grounds. Acreage.	Common Lands Secured for Public. Particulars.	Common Lands Secured for Public. Acreage.	Common Lands Secured for Public. How Secured.	Total Acreage of Parks and Commons.	Acres of Towns to 1 Acre of Open Space.	Persons To 1 Acre of Open Space.	Persons To 1 Acre of Town.	Remarks.
				A. R.		A.		A. R.	A.			
Chelmsford	11,008	2,309	1 park	20 –	—	—	—	20 –	115	550	5	Galley Wood common is 2 miles from town.
Cheltenham	42,914	4,301	4 parks, &c.	87 –	1 common	1,500	Regulated by scheme	1,587 –	3	27	10	Some of the recreation grounds not free, or free only on certain days
Chester	37,105	2,960	1 park, 1 recreation ground	19 –	The Roodee	70	Ancient corporate estate	89 –	3	416	12	
Chesterfield	22,009	1,219	Queen's Park	22 –	Not stated	—	—	22 –	119	1,000	18	
Chorley	23,087	3,614	None	—	—	—	—	—	—	—	—	
Colchester	34,559	11,331	3 parks, &c.	47 1	—	—	—	47 1	241	735	3	
Crewe	32,783	1,336	1 park	40 –	—	—	—	40 –	33	819	24	Corporation intend to purchase 2 large playgrounds
Darwen	34,192	5,959	2 parks	32 –	Darwen Moor	280	Under management of Corporation	312 –	19	109	5	Certain rights reserved as regards 225 acres of Darwen Moor during life of lord of manor.
Dewsbury	29,847	1,468	1 park	73 –	—	—	—	73 –	20	409	20	—
Dudley	45,740	3,615	2 recreation grounds	22 –	—	—	—	22 –	164	2,079	12	—
Durham	14,863	880	None	—	—	—	—	—	—	—	—	—
Eastbourne	34,969	5,410	2 recreation grounds (leasehold)	13 3	—	—	—	13 3	357	2,497	6	Beachey Head is open to the public; but it is said to be doubtful whether it is common land.
Eccles	29,633	2,032	2 recreation grounds	19 –	Tract of waste land being laid out as recreation ground	not stated	Acquired by Corporation	19 0	100	156	14	—

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

II.—*Towns of* 10,000 *and under* 50,000 *Inhabitants* (*One Hundred and Thirty-five in number*)—*Contd.*

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Towns to 1 Acre of Open Space.	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. P.		A. R.		A. R.	A.			
Exeter	37,404	1,883	5 recreation grounds	24 –	—	—	—	24 –	78	1,588	19	—
Faversham	10,478	684	1 recreation ground	20 –	—	—	—	20 –	34	523	15	—
Folkestone	23,700	4,126	3 parks	23 –	—	—	—	23 –	179	1,030	5	—
Gloucester	39,444	1,437	1 park	28 2	—	—	—	28 2	51	1,408	27	Some common land not near city, acreage not stated. Not apparently acquired by Corporation or put under scheme.
Great Yarmouth	49,334	3,567	5 parks, &c.	28 1	Southtown Common	15 –	Bill before Parliament authorising town to acquire common	43 1	82	1,147	13	
Guildford	14,316	604	Castle and grounds, park	9 2	Not stated	—	—	9 2	66	1,590	23	
Harrogate	13,917	1,268	1 recreation ground	7 –	The "Stray"	200 –	Owned and managed by Corporation	207 –	6	67	10	
Hartlepool	21,271	552	None	—	Town Moor	14 3	—	14 3	36	1,418	20	
Heywood	23,185	3,507	Queen's Park	20 –	None	—	—	20 –	175	1,159	7	
Ilkeston	19,744	2,526	None	—	,,	—	—	—	—	—	—	
Keighley	30,810	1,812	3 parks	45 –	Not stated	—	—	45 –	40	684	17	
Kendal	14,430	2,622	Mansion, castle, ruins, and lands	43 –	,,	—	—	43 –	61	336	5	
Kidderminster	24,803	1,213	2 parks	24 1	—	—	—	24 1	50	1,032	20	Delightful and picturesque valley 2 miles away. No scheme.
King's Lynn	18,360	3,061	1 recreation ground	1 –	None	—	—	1 –	3,061	18,360	6	

TABLE III.—*Contd. Statistics of Provincial Open Spaces.*

II.—*Towns of* 10,000 *and under* 50,000 *Inhabitants* (*One Hundred and Thirty-five in number*)—*Contd.*

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Towns to 1 Acre of Open Space	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. R.		A.		A. R.	A.			
Lancaster	31,038	1,577	3 parks, &c.	35 –	—	—	—	35 –	45	886	19	Ground containing 2a. –r. 13¾p., said to be common land. Not acquired by Corporation.
Leamington Spa	26,930	2,816	Parks, gardens, &c.	46 2	Not stated	—	—	46 2	61	585	9	
Lewes	10,997	1,424	Recreation ground	10 3	,,	—	—	10 3	142	1,099	7	1 acre of land given to town in 1601 now being laid as recreation ground.
Lincoln	41,491	3,747	Arboretum	13 –	2 commons	486	Corporation own soil	499 –	7	83	11	
Longton	34,327	1,948	1 park	45 –	None	—	—	45 –	43	743	18	
Loughborough	18,196	3,078	3 recreation grounds	24 –	,,	—	—	24 –	128	758	5	14 acres of ground round Grammar School open to public.
Louth	10,040	2,749	None	—	None	—	—	—	—	—	—	
Luton	30,006	2,613	7 recreation grounds, &c.	61 2	Not stated	—	—	61 2	43	492	11	
Macclesfield	36,001	3,215	2 parks	25 2	Not stated	—	—	25 2	128	1,440	11	
Maidenhead	10,607	2,123	2 ,,	24 –	"The Moor"	6	—	30 –	70	353	5	
Maidstone	32,145	4,008	3 gardens, &c.	19 2	Barning Heath	4	Allotted by Inclosure Commissioners	23 2	174	1,397	8	
Middleton	22,162	4,749	2 parks, &c.	8 –	None	—	—	8 0	593	2,770	4	
Mossley	14,162	3,934	1 park	8 –	Not stated	—	—	8 0	491	1,770	3	
Nelson	22,700	3,235	2 parks	13 –	None	—	—	13 –	248	1,746	7	
Ossett	10,984	3,105	None	—	,,	—	—	—	—	—	—	
Penzance	12,432	355	2 gardens	10 –	,,	—	—	10 –	35·5	1,243	35	
Rawtenstall	29,507	9,525	None	—	,,	—	—	—	—	—	—	

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

II.—*Towns of* 10,000 *and under* 50,000 *Inhabitants* (*One Hundred and Thirty-five in number*)—*Contd.*

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Towns to 1 Acre of Open Space.	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. P.				A. R.	A.			
Reigate	22,646	5,994	Castle and land held on long lease	5 1	2 commons	350	Managed by Board of Conservators	355 1	17	65	4	Over 200 acres of commons near town, under Ancient Memorial rule.
Richmond (Surrey)	26,875	2,160	Terrace gardens, &c.	17 2	—	—	—	17 2	127	1,581	12	Petersham, Sheen, and Ham Commons near borough, not acquired or under scheme. Richmond Park and other gardens are accessible to the public.
Rochester	26,290	2,909	4 recreation grounds	15 1	None	—	—	15 1	194	1,743	9	Only 1 recreation ground is freehold.
Rotherham	42,061	6,002	3 parks, &c.	96 –	None	—	—	96 –	62	437	7	
St. Albans	12,898	997	8 ,, ...	27 –	—	—	—	27 –	37	477	13	Bernards Heath, 35 acres, and other numerous commons in or near town, not acquired or under scheme.
Scarborough	33 776	2,348	Parks, &c.	53 –	No commons	—	—	53 –	45	637	14	
Shrewsbury	26,967	3,525	1 park, 2 pieces of land	26 –	Not stated	—	—	26 –	135	1,037	7	1 piece of land leasehold.
Southport	41,406	3,665	4 parks, &c.	56 –	Not stated	—	—	56 –	65	739	11	
Staleybridge	26,783	3,135	1 park	64 –	None.....	—	—	64 –	49	418	8	Half of park belongs to Ashton-under-Lyne. Open space question under consideration.

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

II.—*Towns of* 10,000 *and under* 50,000 *Inhabitants* (*One Hundred and Thirty-five in number*)—*Contd.*

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Town to 1 Acre of Open Space.	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. P.		A. P.		A. R.	A.			
Stockton-on-Tees	49,708	3,031	2 parks, &c. (1 leasehold)	77 2	None.....	—	—	77 2	22	645	16	Norton village green, 1 mile from borough.
Taunton.....	18,026	1,203	1 park and 2 recreation grounds	22 2	,, ...	—	—	22 2	55	819	15	
Thornaby-on-Tees	15,637	1,997	1 recreation ground	4 –	—	—	—	4 –	499	3,909	8	Green, containing 12 acres, is not under regulation, but Council considering question.
Tiverton.....	10 892	17,680	1 park	6 2	—	—	—	6 2	2,946	1,815	0·6	
Tunbridge Wells	27,895	3,399	1 recreation ground	8 0	Rusthall Common	249 –	Under scheme	257 –	13	108	8	
Tynemouth	46,388	4,317	2 parks:.....	24 2	None.....	—	—	24 2	179	1,941	11	Negociating for 11 acres of land.
Wakefield	33,146	1,521	2 parks, &c.	31 –	None.....	—	—	31 –	49	1,069	21	Common of 140 acres 1 mile from borough, not secured.
Wenlock	15,703	22,657	None.....	—	None.....	—	—	—	—	—	—	
West Hartlepool	42,710	2,454	1 park	17 –	Not stated	—	—	17 –	144	2,512	17	Corporation buying other open spaces of 8 acres.
Widnes	30,011	3,339	None.....	—	None.....	—	—	—	—	—	—	Jubilee Park being bought.
Winchester	19,073	1,049	2 parks, &c.	9 –	Not stated	—	—	9 –	116	2,119	18	
Worcester.....	14,908	3,185	None at present.....	—	—	—	—	—	—	—		Corporation buying (a) park of 50 acres; (b) pasture field of 60 acres.
Worthing	16,606	1,425	Park.....	17 –	Green	9 2	Acquired by Corporation	26 2	54	11	11	3 more acres being acquired.
Wrexham	12,552	1,306	None.....	—	None.....	—	—	—	—	—	—	

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

III.—*Towns of 6,000 but less than 10,000 Inhabitants (Thirty-three in number).**

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds.		Common Lands Secured for Public.			Total Acreage of Parks and Commons.	Acres of Towns to 1 Acre of Open Space.	Persons		Remarks.
			Particulars.	Acreage.	Particulars.	Acreage.	How Secured.			To 1 Acre of Open Space.	To 1 Acre of Town.	
				A. R.		A. R.		A. R.	A.			
Aberavon	6,300	2,060	None	—	None	—	—	—	—	—	—	Mountain land of some 100 acres (not secured for public) near town; in private ownership, but public admitted.
Aberystwyth	6,725	845	None	—	—	—	—	—	—	—	—	
Abingdon	6,557	730	Recreation ground	7 –	Common land	300 –	Acquired by Corporation	307 –	2·2	21·3	8·9	
Beccles	6,669	2,017	None	—	Common	275 –	Vested in Corporation	275 –	7·2	24·2	3·3	
Bridport	6,661	591	None	—	None	—	—	—	—	—	—	
Chichester	7,830	722	1 recreation ground	8 2	None	—	—	8 2	90·2	97·8	10·8	
Dartmouth	6,025	1,924	None	—	—	—	—	—	—	—	—	
Deal	8,891	1,111	Piece of land	– 2	—	—	—	– 2	—	—	8	
Denbigh	6,412	3,980	,,	– 1	Common land	– 2	Under management of committee	– 3	—	—	1·6	
Harwich	8,202	1,526	None	—	None	—	—	—	—	—	—	Extensive gardens and green belonging to War Office are open to public free, except one day a year.
Hertford	9,023	816	None	—	None	—	—	—	—	—	—	

* Eleven towns made no return.

TABLE III—*Contd. Statistics of Provincial Open Spaces.*

III.—*Towns of* 6,000 *but less than* 10,000 *Inhabitants* (*Thirty-three in number*)—*Contd.*

Name of City or Town.	Population.	Area in Acres.	Parks or Recreation Grounds. Particulars.	Parks or Recreation Grounds. Acreage.	Common Lands Secured for Public. Particulars.	Common Lands Secured for Public. Acreage.	Common Lands Secured for Public. How Secured.	Total Acreage of Parks and Commons.	Acres of Towns to 1 Acre of Open Space.	Persons To 1 Acre of Open Space.	Persons To 1 Acre of Town.	Remarks.
				A. R.		A.		A. R.	A.			
Ripon	7,511	1,582	3 recreation grounds	2 –	Field	3 –	Acquired by Council	5 –	316·4	1,502·2	4·7	Also open space of 20 to 30 acres not acquired. Studley Park is two miles from City.
St. Ives	6,094	1,890	Land	– 2	None	—	—	– 2	—	—	3·2	
Saffron Walden	6,104	7,502	None	—	Common used as recreation ground	15	Hired by Council from the lord of manor	15 –	50	404	0·8	—
Sudbury	7,059	1,925	,,	—	None at present acquired	—	—	—	—	—	—	Scheme to acquire large commons about to be approved by Court.
Sutton Coldfield	8,685	12,828	Sutton Park, granted to town by Charter of Henry VIII, vested in Corporation in 1885	not stated	—	—	—	—	—	—	—	—
Stanford	8,358	1,918	Recreation ground	9 1	Not stated	—	—	9 1	213	928·7	4·3	—
Stratford-on-Avon	8,318	4,012	2 recreation grounds	37 –	,,	—	—	37 –	108·4	224·8	2·0	
Tamworth	6,614	285	Field (leasehold)	13 –	,,	—	—	13 –	21·9	503·7	23·2	Council have just bought Tamworth Castle and grounds. Acreage not known.
Welshpool	6,501	20,426	None	—	None	—	—	—	—	—	—	
Wisbech	9,395	6,476	Pleasure ground	14 –	,,	—	—	14 0	462	671	1·4	
Yeovil	9,618	654	Not stated	—	,,	—	—	—	—	—	—	

Discussion *on* Sir R. Hunter's Paper.

Mr. Basil Holmes said that his own interest in the matter was in connection with the society founded by Lord Meath, the Metropolitan Public Gardens Association. Their particular branch of work was getting small open spaces in towns, or crowded and populous districts in and around London. Lord Meath found there were many pieces of vacant land, more particularly disused burial grounds and churchyards, which some ten years ago were in a neglected condition, and he thought these would form breathing places for the people close to their homes. Whilst large spaces and commons were very needful, they could only be utilised on the Saturday half-holiday or Sunday. But it was also necessary to have smaller open spaces close to the homes of the people which could be used in the spare hours of the day. The Public Gardens Association started on that principle, and had formed over one hundred of these smaller open spaces in crowded localities. The society worked in the greatest harmony with the kindred societies with which Sir Robert Hunter and Miss Hill were connected, the Commons Preservation Society, and the Kyrle Society, the three together forming a considerable force in opposition to any inclosure movements which were always being attempted. London owed a great debt of gratitude to the leaders of the open space movement, such as Miss Hill, Mr. Shaw-Lefevre, the Earl of Meath, and Sir Robert Hunter himself, for forming these associations and uniting them in this good work. At present they were engaged in the most useful work as a joint committee in preserving one of those large tracts which still remained on the outskirts of London, namely, Churchyard Bottom Wood, of about 52 acres, which would have been built on but for their efforts, but which they could save by the expenditure of 25,000*l*. They had been jointly getting together this money, and had every hope that in a short time this wood would be saved and added to the adjoining ones which were in the hands of the Corporation of London, so as to preserve a tract of about 150 acres of very beautiful woodland scenery.

Mr. P. Birkett wished to direct attention to the question whether the time had not come for taking decisive steps to prevent the inclosure of commons and open spaces in the future. The paper had proved that such legislation as had taken place, from the Statute of Merton down to 1869, had been to promote inclosures. In 1869 inclosing legislation received a check, and shortly after that date they had a new order of things, and legislation was passed for regulation of commons as opposed to inclosure. But it was obvious that if Bills permitting inclosure were to be allowed to pass into law, land would not

remain for regulation. He would suggest that legislation to prevent the inclosure of common land should not be restricted to common land as lawyers understood the term. There was throughout the country a large area of land which was not technically "common," such as village greens, where possibly all common rights had ceased to be exercised, and allotment land, where persons formerly had the right to take turf, fuel, &c., but which right had fallen into disuse. Where land lay open and unused, except as an open space, there was always the temptation to people to try and convert such land to building purposes; for there was no inducement nowadays to inclose land for the sake of growing corn as in former times. He knew of one case at that moment where it was proposed to inclose over 200 acres of an old fuel allotment. If any one interested in this subject could only induce people, especially members of Parliament, to take up the question and prevent the inclosure of lands by statute, a great work would be done. There were public bodies, railway companies, and so forth, which were constantly trying to take open lands. A great commercial company close to London at that moment was proposing to take 100 acres from a locality whose population had increased from 13,000 in 1871 to 97,000 in the present day. That was the kind of legislation which ought to be stopped, unless a proper equivalent were given for the land so taken away. One very difficult question with regard to the question of inclosure, especially in or near large towns, was how to lay down some general rule. It had been clearly shown that density of population beyond a certain degree must of necessity injure the health of the locality, and it ought not to be difficult to work out to some definite point the density which should never be exceeded, and then it should be absolutely compulsory on a locality to provide an open space directly the density of the population increased beyond this ascertained point.

Mr. George Howell said a great deal had been done already to put an end to wholesale inclosures. The difficulties put in the way of inclosure since Mr. Fawcett, Mr. Morrison, and others took action some years ago, continued to operate until 1884-85. At the present moment all proposed inclosures had to pass through a committee, and that committee exercised its duties for the purpose of insuring provision for open spaces, rather than giving facilities for inclosing them. In the next Parliament, 1885-86, Mr. Buxton, who was a prominent member of the committee, brought the matter before the House, and tightened the regulations very considerably, because he would not consent to what was being done upstairs. He had a good following in the House, and the House rejected the recommendations of the committee. Since then further progress had been made. At the present time a Government Department, the Board of Agriculture, had to report upon every inclosure which was proposed in private Bills, and therefore it had to run the gauntlet first of all of that department, then of the committee, and lastly of the House of Commons itself. To what extent the Commons Preservation Society followed on these lines

he was not so well aware then as he had been at one time, but he should like to call attention to the great work which the author of the paper himself had done in this direction. It might not be known to all, that the Commons Preservation Society owed a great deal to him for the way he had continuously aided them in their labours. They had had great difficulties to contend with, especially when they first undertook the work. In the first instance all the earlier Acts took as their basis the desirability of inclosing common lands in order to provide food for the people. That was what lay at the bottom of everything done by Sir John Sinclair. He was not anxious to take the common lands away from the people of England, for a more generous hearted man perhaps never lived, but his notion was at that time, owing to the difficulties of getting wheat into the country, and the anxiety in many quarters to keep it out, that everything should be done to provide food. Then inclosures were made easy, and that continued until 1845, when the General Inclosure Act was carried. He ventured to hope that, notwithstanding the difficulties in the way at the present moment, if only the localities were on the alert and did their duty, they ought to be able to preserve all that remained of the common lands of England, and if public utility should require that any should be inclosed, it should be made compulsory to hand over an equivalent for it.

Sir Robert Hunter, in reply, said he feared his paper had been inordinately long, but when one came to deal with a subject of this sort there was a great deal to say. Mr. Howell had been extremely kind in the way he had alluded to himself. He had had a long connection with this subject, and he was glad to think that it had fallen to his lot to take part in work which had so direct an influence on the health and welfare of the people of this country. No one would deny that the open space movement had done a great deal for the country. The other day he had the pleasure of a walk in Epping Forest, and he did not think the people of London half realised what a beautiful and extensive pleasure ground they had there. With regard to what Mr. Birkett had said, he thought the present machinery was sufficient for preventing inclosures, if a vigilant watch were kept. However stringent Acts of Parliament might be, and whatever successes might have been gained in defending open spaces in the past, it was never safe to relax in vigilance. Mr. Birkett had alluded to a Bill in Parliament which seemed to fly in the teeth of the Commons Act of 1876, in whatever way it was looked at. He did not wish to go into details, but there were 300 or 400 acres of open land lying just outside Bournemouth which constituted an allotment made by an old Inclosure Act in the earlier part of the century. If this land was a fuel allotment, it came within the section of the Commons Act of 1866, which expressly said that such allotments were not to be diverted from their original purpose except to be used as recreation grounds or field gardens for the labouring poor. If, on the other hand, it did not come within that section, it was in the nature of a common, and the whole legislation of Parliament was to the effect that no

inclosure should be made except on the report of the Board of Agriculture. Notwithstanding, here was a Bill, introduced under the most distinguished authority, promoted by the Attorney-General, not as a member of Government, but as the representative of charities, in which it was proposed to inclose these 300 or 400 acres, to sell them, to give half the proceeds to the lord of the manor, and with the other half to found a charity. It struck those who watched this question as a startling attempt to be made at the present day, and he hoped it would be thoroughly discussed in the House of Commons, and would not be passed unless the promoters could show a better case for it than was apparent at present. The other matter to which Mr. Birkett referred, was an attempt of the East London Water Company to take a very large area of open land in the east of London. Again, they might have a good case for taking it, but it ought not to be taken except under conditions which were beneficial to the public. All these cases showed how necessary was constant vigilance. It might be that something more in the way of legislation was desirable, but it seemed to him that far more important than legislation, was activity in carrying out the laws we already had.

MISCELLANEA.

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I.—*Mr. John Biddulph Martin, M.A.*

The Royal Statistical Society has, for the first time in its history, to deplore the death of a President during his actual tenancy of the Presidential Chair, and in Mr. John Biddulph Martin the Society loses not only one who was held in such esteem by his colleagues as to have been raised to the highest official post at their command, but who also had during almost the whole period of his twenty-three years' Fellowship been closely and prominently identified with the administration of the Society's affairs.

Born in 1841, and educated at Harrow and Oxford, where he graduated in 1862, Mr. John Martin, who was descended from a long line of banking ancestors, entered the famous banking firm of Martin and Co., in Lombard Street, in 1864. In 1874, on the proposition of his brother, Mr. Richard Biddulph Martin, seconded by the late Dr. Farr, Mr. John Biddulph Martin was elected a Fellow of the Royal Statistical Society, rising to a place in the Council in 1879, and serving the Society with much assiduity and ability thereon continually up to his election as President in June, 1896; becoming in this interval, Honorary Secretary in 1880, Honorary Foreign Secretary in 1882, and Trustee in 1892, and holding in conjunction with these offices that of Vice-President in 1892 and 1896.

Throughout his life Mr. Martin devoted much of his leisure to scientific and economic pursuits, besides engaging in active philanthropic work. The wide range of his interests and activity was shown by the fact that at the time of his lamented death he was Treasurer of the Charing Cross and the Royal Orthopedic Hospitals, of the Institute of Bankers, of the International Statistical

Institute, and of the British Economic Association, and President of the London Athletic Club; while the British Association for the Advancement of Science, the Society of Arts, the Society for the Promotion of Hellenic Studies, and the Political Economy Club, as well as the Royal Statistical Society, have lost in him an active and prominent Member, whose presence at their meetings was ever welcome.

The records of his numerous writings must be sought in the Journals of the various bodies named. But taking in detail his special contributions to the Journal of the Royal Statistical Society, these included, it may be noted here, his papers on the Electoral Statistics of the General Elections of 1868 and 1874, read in 1874; his later paper giving a Review of the working of our Representative System from 1832-81, read in 1884, his paper on the effects of a crisis on the Banking Interest in 1879, and lastly the exhaustive and admirable Address, reviewing the recent development and present position of Statistical Science all over the World, with which he signalised his assumption of the Presidential Chair in November last. This address was prepared under difficulties to himself of which he made light, and of which only his more intimate friends were aware, due to the severe illness from which he suffered in the past autumn and winter. Although unable to be present when his Address was read, Mr. Martin sufficiently rallied from his attack to appear in the Chair as lately as in December, 1896, and it was hoped that a brief sojourn abroad, subsequently undertaken to complete his recovery, would allow him to return to London in renewed health—a hope which was sadly disappointed.

Mr. Martin's special interest and knowledge of currency and banking subjects lend particular importance to his labours in this sphere. In 1880 he wrote on the "History, Functions and Fluctuations of the Bank Note Circulation." In 1882 his first paper on "Our Gold Coinage" appeared in the Proceedings of the Bankers' Institute, and to these articles and his subsequent work in conjunction with Mr. Palgrave on this subject in 1883-84, the Journal of that Institute very correctly ascribes much of the attention which was subsequently drawn to the dangerous condition into which the gold currency of this country was lapsing, and the ultimate reforms successfully carried into effect by Mr. Goschen in 1892. There must also be mentioned Mr. Martin's papers before the British Association on "Gold *versus* Goods" in 1883, on "Media of Exchange" in 1884, and in connection with the reports of the committees of the Association on which he served, on the Variation in the Value of the Monetary Standard (1887-90), and on the statistical data for determining the amount of the precious metals in use as money (1888-90).

In connection with the statistical and economic section of the British Association, it must be remembered that Mr. Martin served as Vice-President of Section F at Montreal in 1884, and again almost annually from 1890 onwards, holding the Presidency of the section at Birmingham in 1886, where his Presidential address dealt with economic science and statistics generally.

Still more closely allied to his work for our own Society was the part which Mr. Martin energetically took in the preliminaries for the foundation of the International Statistical Institute in 1885, and in the subsequent management of the business of this body and its successive meetings in various capitals abroad which have replaced the statistical congresses of earlier years. As Foreign Secretary of the Royal Statistical Society during its Jubilee Meeting in the year last mentioned, Mr. Martin was largely engaged in facilitating the attendance of numerous foreign delegates, and utilised the occasion to bring about that friendly co-operation between statisticians of different nationalities which has been found so valuable for the advancement of statistical science and for the better comparison of international data. At a more recent date Mr. Martin's services were again in request, and freely rendered, in the founding of the British Economic Association in 1890, and in looking after the financial affairs of that society.

To the Royal Statistical Society's Library Mr. Martin had repeatedly been a donor, his last presentation in 1892 being that of his own work on "*The Grasshopper in Lombard Street*"—a most interesting and valuable history of the banking house which bears his family's name.

At the time of his unexpected and lamented death the late President of the Royal Statistical Society had proceeded to the Canaries, after recovery from the illness above alluded to, so as to avoid some of the dangers of the British winter and early spring. But to the grief of his friends, after a short residence in these islands, he was again attacked by severe pneumonia, and after a very brief relapse expired on the 20th March, 1897. The closing of a career, so closely identified with many labours of love in the cause of statistics, at an age when many years of useful activity might have been looked for, and just as the chief position open to a Fellow of the Society had been reached, must be felt as a sad loss to the Society itself. By those of his colleagues who had been for many years associated with him, Mr. John Martin's uniform kindness, courtesy and tact will be ever remembered, and in the Council Room of the Society he will be long and sincerely missed.

II.—*Dr. Frederic John Mouat, M.D., LL.D.*

It is with deep regret that we have to record the death of Dr. Frederic J. Mouat, which took place on the 12th January last, at his house in London. In him the Society has lost a Fellow who has constantly from his election as long ago as 1847, and especially after he returned from India in 1870, taken the greatest interest in the welfare of the Society and in the advance of statistical science.

Dr. Mouat was born in 1816, his father being Surgeon Mouat

of the King's Hussars and 13th Light Dragoons. He studied for the medical profession in London, Edinburgh, and Paris, and took the degree of M.D. at Edinburgh in 1839. In the following year he proceeded to India, having been appointed Assistant Surgeon on the Bengal Establishment. In 1841 he became Professor of Chemistry and *Materia Medica*, as well as Secretary and Treasurer of the Bengal Medical College. He remained there until 1853, having been made Professor of Medical Jurisprudence in 1845, and Professor of Clinical Medicine in 1849. In 1853 the new hospital, whose existence was largely due to his efforts, was opened, and he became first physician of the Medical College Hospital. About this period he translated the London Pharmacopœia into Hindostani, and published an important work on anatomy in that language for the military class. While chemical examiner he was the first person to analyse the chemical nature of gutta percha.

In 1843 he was appointed secretary to the Council of Education of Bengal, and edited several educational works. He held that office for ten years, and drew up a scheme for universities in India which was largely adopted in 1854. In 1847 he was sent as president of a committee to explore the Andaman Islands with a view to establishing a convict settlement there. This expedition was attended by considerable difficulty and even danger, but was very skilfully conducted to the entire satisfaction of the government. Dr. Mouat detailed his experiences during this exploration in a book published in 1863, entitled "Adventures and Researches among the Andaman Islanders." In 1855 he was appointed Inspector-General of Jails in India, and while holding this office he introduced the system of remunerative labour for the prisoners with remarkable success.

Dr. Mouat finally retired from the Indian service in 1870, after filling all these various offices with the greatest credit, and returned to England. He was appointed to the office of Inspector-General under the Local Government Board, which he held until March, 1888, when he retired finally from the public service.

In 1871 he was elected a member of the Council of this Society, and from that date until his death was very closely connected with its administration. The first statistical paper he prepared for the Society was published in the *Journal* for 1862,[1] and contained a sketch of the history of prison discipline in India, together with some of the more important results which had been obtained in convict management in the provinces under his charge in Lower Bengal. He contributed a second paper on the same subject in 1867, and a third in 1872, both of the latter being read and discussed by the Society. In 1872-75 Dr. Mouat was one of the Honorary Secretaries of the Society, in 1874 and 1875 he undertook the further duties of editor of the *Journal*, and from 1876 to 1881 he was Honorary Foreign Secretary. One of his most interesting contributions to

[1] Vol. xxv, p. 175.

the *Journal* is to be found in the Jubilee Volume, 1885, and consists of a comprehensive history of the Society from its foundation to the celebration of its fiftieth anniversary in that year. In 1890 Dr. Mouat was elected President, a post which he held for two years.

Numerous and valuable as his contributions to the *Journal* undoubtedly are, the Society owes an almost deeper debt of gratitude for the untiring interest and care which he constantly manifested in its internal administration. He gave the closest attention to all matters connected with the Library, which in his opinion scarcely commanded the notice it really merited, besides presenting to it many valuable works, and carefully regulated nearly all the different forms of expenditure incurred in carrying on the ordinary office work of the Society. On his initiative the valuable file of the *Times* newspaper, which is nearly complete from its origin, was bound and put into thorough order, and an increased amount was authorised to be spent annually on the binding of old works and the purchase of new ones. In order to ensure a better supply of statistical papers on suitable subjects and to encourage statistical research, it was decided by the Council, at Dr. Mouat's suggestion, to found the Guy Medal in honour of the greatest benefactor the Society ever had.

His disposition to work of all kinds in any way connected with the advance of statistical knowledge, his close attention to all details connected with the internal administration of the Society, his courage and perseverance in advocating what he thought right, whatever labour and discomfort it entailed upon himself, deserve the fullest recognition and grateful remembrance of every Fellow

The following are the chief contributions by Dr. Mouat to the *Journal* of the Society, besides those already mentioned:—

International Prison Statistics, vol. xxxix, p. 311, 1876.

Two reports of the Ninth International Statistical Congress at Budapest: First Report, vol. xxxix, p. 628, 1876; Second Report, vol. xl, p. 531, 1877.

Reports on—

(1.) The Fourth Session of the Permanent Commission of the International Statistical Congress, Paris, 1878.
(2.) The First Session of the International Congress of Demography and Medical Geography, Paris, 1878.
(3.) The Second Session of the International Prison Congress, Stockholm, 1878. Vol. xlii, p. 1, 1879.

Education and Training of the Children of the Poor. Vol. xliii, p. 573, 1880.

Tenth Census of the United States of America. Vol. xliii, p. 573, 1880.

Inaugural Address as President. Vol. liii, p. 521, 1890.

Prison Ethics and Prison Labour. Vol. liv, p. 213, 1891.

Second Presidential Address. Vol. liv, p. 571, 1891.

One of the most important works by Dr. Mouat in the Library

of the Society was prepared in collaboration with Mr. H. Saxon Snell in 1884, and is entitled, *Hospital Construction and Management.*

III.—*Changes of Prices of Imports and Exports since* 1881.

By A. L. Bowley, M.A.

The figures in the following tables are practically a continuation of those published by the Board of Trade in 1888, showing the changes in prices of imports and exports from 1854.[2] They may be compared with those given by Mr. Sauerbeck in this *Journal* in March, 1896 (p. 194), but though agreeing in results, differ from his in the grouping of details and choice of base year. A comparison of these results with other similar index-numbers appears in the current number of the *Economic Journal.*

The calculations were made in the statistical class of the London School of Economics last autumn, on the following system:—the more important imports (those exceeding 1,000,000*l.* in any year from 1881 to 1893) and exports (those exceeding 300,000*l.*) were valued at their prices of 1881; the commodities were then grouped under general headings, and the sum of their declared values in each year expressed as percentages of their values at 1881 prices; thus index-numbers were obtained showing the average change of price of different groups and of the whole. During the course of the arithmetical working it became clear that the inclusion of less important items could not have affected the result, which however loses in precision through the omission of some articles of growing importance for which prices are not quoted in 1881, and of others which are not sufficiently defined to make it possible to give an average price.

[2] C–5386, 1888, and former reports.

TABLE 1.—IMPORTS. DECLARED VALUES *of Certain Groups, and their* VALUES AT PRICES OF 1881. 1=1,000,000*l.*

Years	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.
FOOD AND TOBACCO[1]—															
Value at 1881 prices.....	165	165	183	166	179	169	180	184	199	206	208	215	212	228	241
Declared value	165	164	176	146	146	132	137	143	159	160	170	170	161	158	160
Index numbers ..... (percentage that numbers in lower line are of numbers in upper.)	100	100	96	88	81	78	76½	78	80	78	82	79	76	69	67
TEXTILE MATERIALS[2]—															
Value at 1881 prices.....	92·5	102	100·9	101·4	92·6	105·6	108·3	113·2	124·3	113·2	124·9	117·6	104·8	116·9	124·6
Declared value	92·5	97	94·8	94·8	90·3	83·6	87·7	92	104·2	95·8	100·7	89·2	79·4	81·5	81·8
Index numbers	100	95	94	93½	97½	79	81	81	84	84½	81	76	76	70	66
METALS[3]—															
Value at 1881 prices.....	15·9	17·6	18·2	18·4	18·8	17·3	19·1	21·9	23·0	22·5	21·2	21·9	22·1	22·0	23·0
Declared value	15·9	18·0	18·0	16·75	15·95	14·6	16·0	22·4	20·4	21·65	20·1	18·9	18·5	17·4	17·8
Index numbers	100	102	99	91	85	84	84	102	89	95	95	86	84	79	77
MISCELLANEOUS[4]—															
Value at 1881 prices.....	44·4	49·9	53·2	51·8	52·9	49·8	50·8	53·4	61·6	59·1	59·8	63·8	63·7	69·2	72·75
Declared value	44·4	49·6	52·0	46·9	45·6	40·5	39·2	42·9	49·4	46·0	45·2	46·9	46·5	48·9	50·9
Index numbers	100	99	98	90½	86	81	77	80	80	78	76	73½	73	71	70
TOTAL of the four groups—															
Value at 1881 prices	317·7	334·5	355·6	337·8	343·2	341·6	358·5	372·8	407·9	401·1	414·4	419·2	403·0	436·9	461·1
Declared value	317·7	228·6	340·9	304·6	298·2	270·3	279·9	300·8	332·8	323·5	335·5	324·9	305·3	306·0	310·8
Index numbers	100	98	96	90	87	79	78	80½	81½	81	81	77½	76	70	67½

[1] Includes oxen, sheep, bacon, beef (fresh), mutton, meat (preserved), lard, fish (cured), butter, and margarine, eggs, cheese, confectionery, and condensed milk, potatoes, wheat, barley, oats, maize, flour of wheat, coffee, tea, cocoa, currants, raisins, oranges, rice, refined sugar (lump), refined sugar (other sorts), unrefined sugar (beetroot), unrefined sugar (cane), wine, brandy, tobacco (manufactured), tobacco (unmanufactured), as separate items.

[2] Includes cotton (raw), flax (dressed and undressed), hemp (dressed and undressed), jute, silk (raw), wool (sheep and lambs'), goats' hair or wool, woollen and worsted yarn, woollen stuffs, cotton seed, flax seed.

[3] Includes copper (ore, unwrought, part wrought, &c.), pyrites, iron ore, iron bars, iron (girders, beams, and pillars), lead (pig and sheet), tin (blocks, ingots, bars, or slabs), zinc (crude).

[4] Includes caoutchouc, Peruvian bark, indigo, feathers, gum, hides, leather, gloves, nuts (for oil), palm oil, olive oil, oil seed cake, paper and pasteboard, esparto, petroleum, rape seed, cubic nitre, goat skins, sheep skins, tallow and stearine, fir (hewn), fir (split).

TABLE 2.—EXPORTS. DECLARED VALUES *of Certain Groups, and their* VALUES AT PRICES OF 1881. 1 = 1,000,000*l.*

Years.....	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.
RAW MATERIALS[1]—															
Value at 1881 prices.....	14·0	14·5	15·8	16·9	17·1	17·1	17·8	19·8	21·8	22·8	21·8	22·8	21·4	22·4	23·9
Declared value	14·0	14·6	16·0	16·3	15·8	15·2	15·6	18·5	22·0	27·1	25·9	24·0	21·0	23·2	22·6
Index numbers	100	101	101	96	92	89	87½	93½	101	119	119	105	98	104	95
TEXTILES[2]—															
Value at 1881 prices.....	105·6	100·0	102·0	103·5	100·7	109·2	110·5	112·7	113·2	116·2	110·4	109 0	103·8	110·8	118·5
Declared value	105·6	103·0	103·0	101·6	94·35	97·3	99·3	100·1	100·8	102·8	97·0	91·4	88·3	88·6	92·9
Index numbers	100	103	101	98	94	89	90	89	89	88½	88	84	85	80	78
METAL MANUFACTURES[3]—															
Value at 1881 prices.....	30·2	34·1	32·0	28·4	25·8	27·4	32·7	30·0	32·7	31·4	25·9	22·3	23·2	21·8	22·9
Declared value	30·2	34·5	31·4	27·5	24·3	23·9	27·0	27·8	31·4	34·0	29·3	23·9	22·7	20·6	21·6
Index numbers	100	101	98	97	94	87	83	93	96	108	113	107	98	94½	94
MISCELLANEOUS[4]—															
Value at 1881 prices.....	14·5	14·8	15·2	15·5	14·9	14·4	14·9	16·4	16·2	16·4	16·1	15·4	15·4	15·4	15·9
Declared value	14·5	15·1	15·1	14·8	13·9	13·0	13·1	14·0	14·3	14·8	14·5	13·5	13·0	12·2	12·3
Index numbers	100	102	100	95½	93	90	88	85	88	90	90	88	84	79	77
TOTAL of the four groups—															
Value at 1881 prices.....	164·4	163·4	165·1	164·3	158·5	168·2	175·8	178·9	183 8	186·8	174·1	169·5	163·8	170·4	181·2
Declared value	164·4	167·2	165·6	160·2	148·3	149·3	155·0	160·5	168·5	178·7	166·7	152 9	145·0	144·6	149·3
Index numbers	100	102	100	97½	94	89	88	90	92	96	96	90	88½	85	83

[1] Includes coal (cinders and fuel), herrings, copper (unwrought), lead (pig, sheet, and pipe), tin (unwrought), clay (unmanufactured), wool (not yarn or manufactured).
[2] Includes *cotton*—yarn, piece goods, stockings, thread; *linen*—yarn, piece goods, thread; *jute*—yarn, manufactures; *wool*—yarn, cloths, flannels, stuffs, carpets; silk manufactures; other yarn.
[3] Includes iron and steel manufactures, copper (wrought), brass.
[4] Includes alkali, bags (empty), biscuit and bread, candles, cement, cordage and twine, glass (common bottles), gun powder, leather (unwrought), leather (wrought), oil and floor-cloth, paper, rags and other materials for paper, sugar (refined).

IV.—"*Mathematical Contributions to the Theory of Evolution. On Telegony in Man, &c.*" By Professor KARL PEARSON, M.A., F.R.S., University College, with the assistance of Miss ALICE LEE, Bedford College, London.

[Communication made to the Royal Society and published in the *Proceedings*, vol. lx, No. 363.]

(1.) THE term telegony has been used to cover cases in which a female A, after mating with a male B, bears to a male C offspring having some resemblance to or some peculiar characteristic of A's first mate B. The instances of telegony usually cited are (i) cases of thoroughbred bitches when covered by a thoroughbred dog, reverting in their litter to half-breds, when they have been previously crossed by dogs of other races. Whether absolutely unimpeachable instances of this can be produced is, perhaps, open to question, but the strong opinion on the subject among dog-fanciers is at least remarkable; (ii) the case of the quagga noted by Darwin (see *Origin of Species*, 4th edit., p. 193), and still more recently (iii) a noteworthy case of telegony in man cited in the *British Medical Journal* (see No. 1834, February 22, 1896, p. 462).

In this latter case a very rare male malformation, which occurred in the male B, was found in the son of his widow A, by a second husband C. Here, as in the other cases cited, a question may always be raised as to the possibly unobserved or unknown occurrence of the characteristic in the ancestry of either A or C, or again as to the chance of the characteristic arising as a congenital sport, quite independently of any heredity. It seems unlikely that the observation of rare and isolated cases of asserted telegony will lead to any very satisfactory conclusions, although a well directed series of experiments might undoubtedly do so. On the other hand, it is not impossible that an extensive and careful system of family measurements might bring to light something of the nature of a telegonic influence in mankind.

If such a telegonic influence really exists, it may be supposed to act in at least two and, very possibly, more ways.

(*a*.) There may be in rare and isolated cases some remarkable change produced in the female by mating with a particular male, or some remarkable retention of the male element.

(*b*.) There may be a gradually increasing approximation of the female to the male as cohabitation is continued, or as the female bears more and more offspring to the male.

It is extremely unlikely that any system of family measurements would suffice to bring out evidence bearing on (*a*). On the other hand, a closer correlation between younger children and the father, and a lesser correlation between younger children and the mother, as compared with the correlation between elder children and their parents might, perhaps, indicate a steady influence like (*b*) at work in mankind. Shortly, such measurements might suffice to answer the question as to whether younger children take more after their father and less after their mother than elder children. Without hazarding any physiological explanation as to

the mode in which telegonic influence can or does take place, we may still hope to get, at any rate, negative evidence as to a possible steady telegonic influence by an investigation of suitable family measurements.

(2.) Unfortunately, the collection of family data is by no means an easy task, and to procure those head-measurements which, I think, would be most satisfactory for the problem of heredity, would require a large staff of ready assistants, and could only be undertaken on the necessary scale by the action of some scientific society or public body. The data concerning 800 to 900 families which have been recently collected for me deal only with stature, span, and arm length, which are measurable with more or less accuracy by the untrained observer, and are only suitable for more or less rough appreciations of hereditary influence. The numbers in each family measured were strictly limited, in order to remove the influence of reproductive selection from the determination of the correlation between parents and children, and the result of this limitation has been that comparatively few couples of elder and younger brothers, and of elder and younger sisters are available. They were, indeed, collected in the first place with a view to the problem of heredity in the direct line, and with no thought of their throwing any light on the problem of telegony. That steady telegonic influence might be deduced from such family data has only recently occurred to me, and I should now hesitate to publish any conclusions on this subject, based on somewhat mixed and sparse returns, did I not consider that it may be a long time before more extensive returns are available, and that the publication of this method of dealing with telegony may induce others to undertake the collection of a wider range of material.

My own 800 family data cards did not provide a sufficiently large number of either brother-brother or sister-sister couples to give a strong hope of a difference between the correlation coefficients sufficiently large as compared with its probable error to base any legitimate conclusion upon. I therefore again borrowed from Mr. Galton his 200 family data returns, and from these 1,000 families was able to select 385 brother-brother pairs and 450 sister-sister pairs. In these statistics each individual is only included in one pair, and the difference in age between the elder and younger members of each pair differs very widely from pair to pair. In some cases there may be several years between the ages and several intervening children; in others the members of the pair may be successive children following each other in successive years. In each case all we can say is, that if there be a steady telegonic influence, the relation of the elder member to the parent will weigh down the same scale, and in the final result we ought to find a distinctly greater or less correlation, as the case may be. I think a more serious objection to the data than the variation in the number of years between fraternal pairs is the mixture I have made of data collected at different periods and in somewhat different manners. My own data are drawn, I think, from a wider class of the community than Mr. Galton's. They are not exclusive of his class, but, I think, cover his class, and

go somewhat further down in the social scale. They suffice to show that the means and variations change considerably from one social stratum to another, and, what is still more important, that the Galton functions or coefficients of correlation for heredity are far from being constant even within the same race as we pass from one rank of life to a second. Thus my means for stature in the case of both fathers and mothers are upwards of $\frac{1}{2}$ inch less than Mr. Galton's, but my means agree fairly well with his results in the case of both sons and daughters. There are also good agreements and somewhat puzzling disagreements not only in the variations, but, above all, in the coefficients of correlation for heredity. I reserve for the present the full discussion of my heredity data, but I wish it to be quite understood that my conclusions in this paper are based, not upon the best possible data, *e.g.*, measurements made on one class of the community under one system, but upon all the data which, for some time to come, appear likely to be available. These data are neither quantitatively nor qualitatively ideal, but, on the other hand, they must be given a reasonable amount of weight in considering whether, at any rate in the case of one organ—stature—any steady telegonic influence can be traced in man.

The reduction from the family measurement-cards, the formation of the eight correlation tables, and the calculation of both variation and correlation coefficients, have been undertaken by Miss Alice Lee, of Bedford College—a task requiring much labour and persistency. I have independently verified, and in some minor points corrected, her calculations, as well as added the probable errors of the constants determined.

(3.) The following are the means and standard-deviations with their probable errors for the various groups :—

TABLE 1.—*Stature of Families in Inches.*

Class.	Number.	Mean.	Standard Deviation.
Fathers of sons	385	68·5740 ± 0·0878	2·5554 ± 0·0621
Elder sons	,,	69·1494 ± 0·0913	2·6550 ± 0·0645
Younger sons.....	,,	69·1948 ± 0·0933	2·7128 ± 0·0659
Mothers of sons.....	,,	63·3078 ± 0·0854	2·4848 ± 0·0604
Fathers of daughters....	450	68·3344 ± 0·0878	2·7605 ± 0·0621
Elder daughters.....	,,	63·9244 ± 0·0823	2·5878 ± 0·0582
Younger daughters ...	,,	64·2200 ± 0·0794	2·4985 ± 0·0562
Mothers of daughters	,,	63·1794 ± 0·0758	2·3827 ± 0·0536

All the quantities have here been calculated precisely as in my third memoir on the mathematical theory of evolution (see *Phil. Trans.*, A, vol. 187, pp. 270 and 271). In this case, however, no child is included twice as a child, and parents are not weighted with their offspring. Thus reproductive selection is not allowed to influence the results.

It will be seen that the probable errors of the means and standard deviations are, as in the former paper, too large to allow of absolutely definite conclusions when those conclusions are not

supported by a continuous change of values, or directly verified by the numbers of the earlier memoir. But one or two such conclusions may be drawn, and I will note them before passing to correlation.

(i.) The law of sexual interchange referred to in my former paper is confirmed with greater uniformity. Fathers of sons are sensibly less variable than fathers of daughters, and mothers of daughters are sensibly less variable than mothers of sons. In other words, to judge from stature, the exceptional parent tends to have offspring of the opposite sex.

(ii.) Younger sons are taller and more variable than elder sons, and elder sons are taller and more variable than fathers.

This conclusion, although less markedly, appears in the results of my former paper. It might be accounted for by :—

(*a*.) A secular change going on in the stature of the population, and even noticeable in the difference between the stature of younger and elder sons.

(*b*.) A further growth of sons, and an ultimate shrinkage, which will leave them at the age of their fathers with the same mean height and variation.

(*c*.) Conditions of nurture on the average less favourable, and on the whole less varied in the case of elder than in that of younger children.[3]

(*d*.) Natural selection. The difference between younger and elder sons and between elder sons and fathers represents the selective death-rate in man due to causes correlated with stature in the years between youth and manhood and manhood and age. The difference is thus to be accounted for by a periodic and not a secular change.

Possibly (*a*), (*b*), (*c*), and (*d*) may all contribute to the observed results. It cannot be denied that (*d*) has a special fascination of its own for the student of evolution, but prolonged study of the laws of growth must precede the assertion that we have here, or in any similar case, real evidence of an actual case of natural selection.

(iii.) Younger daughters are taller than elder daughters and elder daughters than mothers.

This is in complete agreement with the result for fathers and sons. Further :—

Daughters, as a class, are far more variable than mothers, but while in the earlier memoir younger daughters were sensibly more variable than elder daughters—and thus exactly corresponded with sons—elder daughters are in this case more variable than younger. I have been unable to find any slip in the tables or calculations which might account for this divergence. It exceeds considerably the probable error of the observations, and is not in accordance with the general law connecting the variation of parent and offspring evidenced for both sexes in the earlier, and for sons

[3] Mr. Francis Galton suggests this as a possible cause. It has, I think, to be taken in conjunction with a greater amount of parental experiment, not only in the birth, but in the nurture of the elder children.

in the present memoir—*e.g.*, the variation—whether it be due to growth-change, or to selective death-rate, or to secular evolution—diminishes with age.

(4.) The following are the coefficients of correlation (r) and the coefficients of regression (R) for parents and sons :—

TABLE 2—*Inheritance of Stature by Sons.*

	r.	R.
Father and elder sons	0·4120 ± 0·0264	0·4281
,, younger sons	0·4170 ± 0·0262	0·4427
Mother and elder sons	0·4094 ± 0·0265	0·4374
,, younger sons....	0·4111 ± 0·0264	0·4488

If we measure, as seems reasonable, the hereditary influence of parentage by the magnitude of the coefficient of correlation between parent and offspring, then several important conclusions may be drawn from this table :—

(i.) There is no sensible difference between the influences of the father on younger and on elder sons, and no sensible difference between the influences of the mother on younger and on elder sons.

If we pay attention to such slight differences as exist, there would appear not to be an increase of paternal and a decrease of maternal influence on younger children, but an extremely slight increase of both. In other words, so far as stature in sons is concerned, judged by correlation : *No steady telegonic influence exists.*

(ii.) There is a very slight prepotency of the father over the mother in the case of both younger and elder sons; a prepotency which will be slightly magnified when account is taken of the absolute stature of the two parents.

But the great prepotency of paternal inheritance noticed in the former memoir is not confirmed. The coefficients of maternal inheritance have been increased by more than 30 per cent. (from 0·293 to 0·410), while those of paternal inheritance (0·396 as compared with 0·414) have remained almost stationary. This result seems to show the want of constancy of the Galton's functions for heredity within the same race. An explanation on the ground that the present statistics embrace a wider range of the community than the earlier, and possibly a more closely correlated class,[4] fails, at any rate in part, owing to the sensible constancy of the paternal correlation. The main difference of course between the present and the former statistics is the exclusion of the influence of reproductive selection; but why should this be expected to influence only the mother? The father of many children remains equally influential, but the mother's relation is weakened when we give

[4] I have pointed out (*loc. cit.*, p. 284) that working and lower middle class families appear to be more closely correlated than those of the upper middle class.

weight to the quantity not the relative ages of her children. This is not a steady telegonic influence, but a correlation between fertility and hereditary influence in mothers, which if it could be verified by further observation would undoubtedly be of high significance. I would accordingly suggest as a possible law of heredity, deserving careful investigation, that: *Hereditary influence in the female varies inversely as fertility.*

In my paper on "Reproductive Selection" (*Roy. Soc. Proc.*, vol. lix, p. 301), I have pointed out the important evolutionary results which flow from a correlation between fertility and any inheritable characteristic. If a law of the above character should be established after further investigation, it is conceivable that it may act as an automatic check on the extreme effects of reproductive selection.

(iii.) The above results give us for practicable purposes a quite sufficiently close value of the correlation between parents and sons, when the influence of reproductive selection is excluded. Judging from stature, the correlation between sons and parents is very closely given by

$$0{\cdot}41 \pm 0{\cdot}03.$$

The $\frac{1}{3}$, adopted by Mr. Galton, may, I think, safely be increased by 25 per cent., and further, the assumption that collateral heredity is twice as strong as direct heredity must, I hold, be finally discarded, for no determination of the former has given such a high value as 0·82.

(5.) Hitherto we have regarded only the coefficients of correlation, and considered them to measure the strength of the hereditary influence, but it must be remembered that the means of elder and younger sons are not the same, and that there is another way of looking at the problem. We may ask: Do younger or elder sons differ most from the stature of their father, and is the order altered in the case of the mother?

If we neglect the influence of sexual selection (see *Contributions to Math. Theory of Evolution*," III, pp. 287 and 288) we have, if h_f and h_m be deviations of father and mother from their means, and M_e and M_y be mean heights of corresponding fraternities of elder and younger sons in inches:—

$$M_e = 69{\cdot}1494 + 0{\cdot}4281h_f + 0{\cdot}4374h_m.$$
$$M_y = 69{\cdot}1948 + 0{\cdot}4427h_f + 0{\cdot}4488h_m.$$

Now the ratio of the mean heights of parents is 68·5740 : 63·3078 = 1·0832,[5] while the ratios of 0·4374 to 0·4281 and 0·4488 to 0·4427, are only 1·0219 and 1·0139 respectively; thus there is still a slight prepotency of paternal influence on stature to be recorded. (See Sec. (4) (ii)).

Confining our attention to the differences in stature for fathers and sons corresponding to all mothers whatsoever, we have, if D_{ef} be the difference in stature between father and corresponding

[5] 13/12 = 1·0833; thus these returns again confirm Mr. Galton's selection of this fraction for the sexual ratio for stature.

fraternity of elder sons, D_{yf} between father and fraternity of younger sons :—

$$D_{ef} = 0{\cdot}5754 - 0{\cdot}5719h_f.$$
$$D_{yf} = 0{\cdot}6208 - 0{\cdot}5573h_f.$$

Hence the difference between the father and fraternity of younger sons will be greater than the difference between the father and the corresponding fraternity of elder sons unless the father be 3·110 inches less, or 1·059 more than the average. But 3·11 is about 1·2 and 1·059 about 0·415 times the standard deviation of the stature of fathers, or, fraternities of younger sons are nearer in stature to their father than fraternities of elder sons in about 46 per cent. of cases.

Similarly if D_{em}, D_{ym} represent the differences of stature of mothers and fraternities of elder and younger sons respectively, we have in inches—

$$D_{em} = 5{\cdot}8416 - 0{\cdot}5626h_m.$$
$$D_{ym} = 5{\cdot}8870 - 0{\cdot}5512h_m.$$

Thus fraternities of younger sons are always more divergent than fraternities of elder sons from the stature of their mothers, unless the mother be 3·982 inches less, or 10·53 inches more than the average. These are 1·6 and 4·24 times the standard deviation in stature of mothers; or, only in about 5·5 per cent. of cases are fraternities of younger sons nearer in stature to their mothers than elder sons.

Now it is difficult to read into these results any evidence for a steady telegonic influence. It is true that the case of younger sons being more like their parents than elder sons occurs in eight times as many cases with the father as with the mother, but the broad fact remains that in more than half the cases, judged by difference of stature, the elder son is more like the father than the younger son. In fact, examined in this way by difference of stature—not an unnatural manner of first approaching the problem—the true closeness of parent and offspring appears to be quite obscured by some secular, or, at any rate, periodic (see Sec. 3) evolution in stature between successive generations—an evolution which even makes itself felt in the interval between younger and elder sons.

(6.) Turning to the results for daughters, we have the following table for the coefficients of correlation and regression :—

TABLE 3.—*Inheritance of Stature by Daughters.*

	r.	R.
Fathers and elder daughters	0·4829 ± 0·0220	0·4528
,, younger daughters	0 4376 ± 0·0236	0·3961
Mothers and elder daughters	0·3953 ± 0·0250	0·4293
,, younger daughters	0·4542 ± 0·0230	0·4763

These results, more numerous than those for sons, are, for reasons which I am unable to explain, much more divergent. We may note the following points :—

(i.) There is a sensible difference between the coefficients of correlation for either parents with younger and elder daughters. Thus, the difference of the coefficients for fathers with elder and younger daughters is 0·0453, and the probable error of this only 0·032; while for mothers the corresponding difference is 0·0589, and the probable error of the difference only 0·0328. The difference, however, is in the *opposite* sense. We are thus face to face with an increasing maternal and a decreasing paternal influence on the stature of daughters. In other words, our statistics are entirely opposed to any steady telegonic influence on the stature of daughters. If such a thing were conceivable, we should be confronted with the case of the mother influencing the father, the reverse of telegony.

(ii.) The mean correlation of fathers and daughters is very slightly higher than that of mothers and daughters (0·4602 as compared with 0·4247). Thus, to judge by the mean coefficients of correlation, the father is slightly more prepotent than the mother in heredity. The mean coefficients of regression are for fathers 0·4244, and for mothers 0·4528, or in the ratio of 1 : 1·067, but the ratio of the paternal to the maternal stature is 1·083, or this slight prepotency is still preserved if we judge the matter by regression coefficients. Again, we notice an immense increase (0·2841 to 0·4247) in the correlation between mothers and daughters when we compare the present results with those of my earlier memoir. As an explanation of this, I have already suggested the possibility of a law exhibiting a relation between fertility and hereditary influence in mothers (Sec. 4 (ii)).

(iii.) The mean coefficient of correlation in stature between either parent and a daughter may be taken to be—

$$0{\cdot}44 \pm 0{\cdot}02.$$

Thus it does not differ very widely from the value suggested (0·41) for sons, but is even further removed from the value (0·33) at first determined by Mr. Galton.

The greater correlation between sons and both parents noticed in my first memoir is not borne out by the present statistics; the advantage is now—it is true to a much less extent—with daughters.

On the whole, I am not well satisfied with these results for daughters. I can see no persistent source of error in the method of collecting the observations, nor can I find any mistake in the calculations. I can only trust that more elaborate returns and measurements of other characteristics may some day throw light on what now appear to be anomalies.

(7.) Finally, I may just notice what conclusions are to be drawn, if we pay attention to the absolute difference in stature between parents and daughters. Let δ_{em} and δ_{ym} be the differences in stature between elder daughters and mothers, and younger daughters and mothers respectively, then in inches we have for the corresponding arrays:—

$$\delta_{em} = 0{\cdot}7450 - 0{\cdot}5707 h_m.$$
$$\delta_{ym} = 1{\cdot}0406 - 0{\cdot}5237 h_m.$$

Thus, arrays of younger daughters differ more from their mothers in stature than arrays of elder daughters, if the mothers be more than 6·29 inches below the mean or more than 1·63 inches above the mean, or if their deviations are not within the limits of about — 2·64 and 0·68 times the standard deviation of mothers. This gives us about 74 to 75 per cent. of elder sisters nearer in stature to their mothers than younger sisters.

If δ_{fe}, δ_{fy} be the stature differences for fathers and daughters, we have:—

$$\delta_{fe} = 4{\cdot}4100 - 0{\cdot}5472h_f.$$
$$\delta_{fy} = 4{\cdot}1144 - 0{\cdot}6039h_f.$$

Here, so long as the father lies between 5·21 inches less and 7·41 inches more than the average, the array of younger daughters will more nearly approach him in stature than the array of elder daughters. These limits correspond to 1·89 and 2·68 times the standard deviation of fathers. Accordingly, about 96 to 97 per cent. of younger sisters are closer in stature to their fathers than elder sisters. Thus, if we had started the discussion of the problem from a consideration of the relative nearness in stature of daughter to father and mother, we should have found that a great majority of younger sisters were nearer to their fathers than their elder sisters, and a considerable majority of elder sisters nearer to their mother than their younger sisters. We might then have concluded that there were substantial grounds for inferring the existence of a telegonic influence. But it is clear that if there be anything of the nature either of a periodic or of a secular change in stature going on, then since men are taller than women, any group of younger women will appear closer to their fathers than to their mothers, when compared with a group of elder sisters. Thus, no legitimate argument as to telegonic influence can be based on such a result. I have purposely considered this method of approaching the problem, because it is the method which first occurred to me, as it probably may do to others. It can very easily, however, lead to our mistaking for a real telegonic influence an effect of periodic or secular evolution, or, indeed, of different conditions of nurture.

(8.) In conclusion, we may, I think, sum up the statistics discussed in this paper as follows:—

(i.) So far as stature is concerned, there is no evidence whatever of a steady telegonic influence of the male upon the female among mankind.

(ii.) It is improbable that the coefficients of correlation which measure the strength of heredity between parents and offspring are constant for all classes even of the same race.

For stature in the case of parents and offspring of both sexes, the value 0·42, or say 3/7, may be taken as a fair working value, until more comprehensive measurements are made. This makes hereditary influence in the direct line stronger than has hitherto been supposed.

(iii.) The divergence between the results of this memoir and that of the former memoir on "Regression, Heredity, and Panmixia" would be fairly well accounted for, if there be a hitherto unobserved correlation between the hereditary influence and the fertility of woman.

V.—*The Agricultural Returns of* 1896.

The annual volume of *Agricultural Returns* for 1896, recently issued [C–8502], embraces in their final form all the official information available respecting acreage and live stock, production and prices in Great Britain, formerly laid before Parliament in three separate annual publications. The leading features have already been made public in seven preliminary statements issued between August, 1896, and March, 1897; but the final volume contains also various incidental statements relating to the imports and exports of agricultural produce and the statistics of foreign and colonial agriculture, while occasion has been taken to reproduce for convenient reference summaries of the special returns issued in March, 1897, respecting the number and size of agricultural holdings in Great Britain.

The tables, which have been considerably extended and reach a total of 124, are prefaced by a report presented by Major Craigie to the President of the Board of Agriculture. This presentation of the Agricultural position reviews in the first place the general distribution of the surface, and with the aid of a coloured diagram map indicates how widely the distinctive features of the eastern and western sections of Great Britain vary in their agricultural character, the data on this point being summed up as under:—

Divisions.	Total Area of Land and Water.	Returned as under Woods and Plantations.	Approximate Area of Mountain and Heath Land used for Grazing.	Permanent Pasture.	Arable Land.
	Thousands of acres.	Thousands of acres.	Thousands of acres.	Thousands of acres.	Thousands of acres.
England:					
Eastern and South-Eastern counties ..	14,639,	825,	191,	5,087,	6,851,
Western & Northern counties	17,905,	841,	1,948,	8,267,	4,626,
Total England	32,544,	1,666,	2,139,	13,354,	11,477,
Wales	4,774,	182,	1,128,	1,977,	858,
Scotland.					
Eastern counties	6,545,	457,	2,121,	519,	2,174,
Western counties	12,909,	421,	7,295,	876,	1,327,
Great Britain	56,772,	2,726,	12,683,	16,726,	15,836,

In the arrangement of this table it will be observed that the eastern side of England roughly represents the region where arable culture is prominent, while the counties lying to the west and north constitute the distinctively grazing section, which, including hill grazings with ordinary permanent grass, possess a total surface of more than 10 million acres of this description against only half this area in the east.

The figures of the above table relate to Great Britain alone, but adding for comparative purposes the Irish figures and those for the Isle of Man and Channel Islands, the general distribution of the cultivated land of the entire United Kingdom in 1896 compares as follows with that recorded in the two preceding years :—

United Kingdom Areas.	1894.	1895.	1896.
AREAS.	Thousands of acres.	Thousands of acres.	Thousands of acres.
Under all crops and grass	47,920,	47,883,	47,882,
Permanent pasture	27,578,	27,831,	27,974,
Arable land	20,342,	20,052,	19,908,
Corn crops	9,366,	8,865,	8,863,
Green crops	4,486,	4,400,	4,429,
Clover, &c., under rotation	5,863,	6,061,	5,960,
Flax	103,	97,	74,
Hops	59,	59,	54,
Small fruit	69,	75,	77,
Bare fallow	396,	495,	451,

The estimated produce of the same three years for the United Kingdom as a whole is contrasted as under, placing the oat crops as the largest of our cereals at the head of the list.

United Kingdom Crops.	1894.	1895.	1896.
	Thousands of qrs.	Thousands of qrs.	Thousands of qrs.
Oats	23,858,	21,810,	20,357,
Barley	9,825,	9,379,	9,728,
Wheat	7,588,	4,786,	7,281,
	Thousands of tons.	Thousands of tons.	Thousands of tons.
Potatoes	4,662,	7,065,	6,263,
Turnips	30,678,	29,221,	28,037,
Mangold	7,310,	6,376,	5,875,
Hay (all sorts)	15,699,	12,238,	11,416,

The crop of oats produced in the United Kingdom represented in 1896 nearly 1,500,000 quarters less than was secured in 1895, and 3,500,000 quarters, or nearly 15 per cent., less than in 1894, reductions largely due to the diminished acreage which accompanied the somewhat inferior yield of the past season. Against this loss, the total barley crop of 1896 is estimated as larger by

about 349,000 quarters than in 1895, but less by 100,000 quarters than in 1894. There was in the wheat crop a double recovery both in acreage and in the yield, which furnished the United Kingdom with some 2,500,000 quarters more of the standard bread corn than in 1895. This addition to the home supply represented, it is pointed out, a larger supply than had been imported from India, Canada, and Australasia collectively during the previous cereal year, while the weight and condition of the British wheat harvested in 1896 was exceptionally good.

The report examines in detail the area and produce of the several crops of Great Britain, and devotes somewhat more space than usual to the recent increase in the numbers of young stock and to the numbers and distribution of cattle in the several counties, their density in respect of the measured area of different districts being illustrated by a coloured diagram map, and some new proportional tables.

On the total area of England, according to the data collected, the aggregate herds of cattle ranged in density from 87 per 1,000 acres in the eastern part of the most arable division, and 88 per 1,000 in the five south-eastern counties, to 169 per 1,000 acres in the west Midlands, 186 in the four south-western counties, and 191 in the north-west. Referring to the variations shown between individual counties, it is pointed out that the results would be by no means similar were a winter census of live stock taken; but in June, 1896, it appeared that Cheshire, with 267 cattle for each 1,000 acres of aggregate area, stood highest of the English counties; while Suffolk and Kent, with 72 cattle per 1,000 acres, occupied the other extreme. Scotland, judged by this standard, which, however, makes no allowance for areas on which cattle could not be maintained, has only an average of 62 head per 1,000 acres of surface.

Making for sheep a similar comparison, the flocks of Wales take precedence, as reaching 672 per 1,000 acres of area; those of England average 493 per 1,000 acres, and those of Scotland 384 per 1,000 acres. In the county of Brecon and in some Scotch border counties, such as Roxburgh, Selkirk, and Berwick, there are over 1,000 sheep per 1,000 acres of total area.

The cattle of all descriptions in Great Britain were increased by 139,000 head in the past year, and sheep of all ages in Great Britain in 1896 were 913,000 more than in 1895. The number of swine was slightly reduced from 1895, but considerably higher than in 1894 or 1893.

The report deals as on other occasions with the movements in the prices of corn and of meat, and compares the recent changes with the values current in five-year periods since 1866. The decline in the sixth quinquennium ending with 1895 compared with the values of 1866-70 is given as 49 per cent. in wheat, 35 per cent. in barley, and 29 per cent. in oats, the major part of the drop occurring since 1880. Comparing the prices of the single year 1896 with those of the decade 1866-75, the drop in wheat was 52 per cent., in barley 41 per cent., and in oats 43 per cent.

The report further discusses in some detail the growth both in bulk and aggregate value of the food imports of the United Kingdom,

comparing these over the average of four quinquennial periods from 1876-80 to 1891-95, occasion being taken to show the reduced prices at which the larger imports of the recent years have been procured. In an examination of the parallel growth of the population and of imported food, it is pointed out that a larger quota of meat, dairy produce, grain and fruit has been imported than would have been required, had there been no change in the rates of production and of consumption, to meet the extended demand due simply to the mean addition of 4,500,000 to the population between the first and last quinquennium. Although not official at the earlier date, estimates of the native production are published, from certain data which have been from time to time employed with some degree of confidence in the case both of wheat and of meat.

In wheat, the figures, it is well known, show that between 1876-80 and 1891-95 the native production declined absolutely as well as relatively from the diminished area under this cereal, while the consumption per unit of the population has been apparently increased from 337 lb. per head to 370 lb., only 89 lb. of the latter total however being now produced at home against 128 lb. on the average of the earlier quinquennium.

Owing to the larger stock of cattle now maintained within the country, the home supply of meat, on the contrary, has been materially increased, the estimate being 2,000,000 cwt. greater than in 1876-80, or sufficient to have maintained, at the old rate of consumption, a large section of the fresh population. Nevertheless a much greater growth of the imports is shown to have occurred, for including the produce of living animals as well as the meat imported dead, meat imports rose from 7,900,000 cwt. to 13,700,000 cwt.

This abundant supply of beef, mutton, and pig meat has made available for the yearly ration of each inhabitant a total larger than before, and reaching in the last quinquennium nearly 122 lb. per head, as compared with the calculation of 112 lb., in 1876-80. The changes indicated in this case are compendiously exhibited by the following summary table:—

Period.	Estimated Home Production of Meat.	Meat Imported Alive or Dead.	Total Meat available for Consumption.	Percentage of Total Consumption derived from Imports.	Rate per Head of Population.		
					Home Production.	Imported.	Total.
	Mln. cwt.	Mln. cwt.	Mln. cwt.	Per cnt.	lbs.	lbs.	lbs.
1876–80	26·0	7·9	33·9	23·2	86·0	26·0	112·0
'81–85	26·1	8·7	34·8	25·1	82·2	27·5	109·7
'86–90	26·9	10·8	37·7	28·5	81·8	32·7	114·5
'91–95	28·0	13·7	41·7	32·8	81·7	40·0	121·7

The last section of the report relates to a series of comparisons which have been attempted on this occasion between the changes in wheat acreage and in the number of live stock shown in the agricultural statistics of foreign countries and British possessions,

so far as the somewhat imperfect data of the available returns permit over the four quinquennial periods covering the interval from 1876 to 1895, which has seen many important alterations of the relative agricultural position of different parts of the world's surface.

VI.—*Number and Size of Agricultural Holdings.*

A Parliamentary Return presented during the current session contains the results of a special inquiry, somewhat similar to the investigations made ten years previously, into the number, size, and distribution of agricultural holdings in Great Britain in 1895, together with Major Craigie's explanatory report to the President of the Board of Agriculture thereon.

The acreage accounted for was that returned in the year 1895 as under "crop, bare fallow, or grass." It does not, therefore, include the rough grazings attached to many farms in hilly districts, whereof the surface is only approximately estimated from year to year, but is confined to what is usually regarded as cultivated land—an area of nearly 32,600,000 acres. This surface was found to be farmed in 520,106 separate holdings, the distribution of which is shown, in the tables, in eight classes from 1 acre to over 1,000 acres.

The following summary shows, both as regards numbers and acreage, how the several grades of agricultural holdings were divided, together with the average size of the holdings of Great Britain in each of the enumerated classes:—

Classification of Holdings.	Number.	Percentage of Number.	Acreage.	Percentage of Acreage.	Average Size of Holding.
Acres. Acres.	No.	Per cnt.	Acres.	Per cnt.	Acres.
Above 1 and not exceeding 5	117,968	22·68	366,792	1·13	3
„ 5 „ „ 20	149,818	28·80	1,667,647	5·12	11
„ 20 „ „ 50	85,663	16·47	2,864,976	8·79	33
„ 50 „ „ 100	66,625	12·81	4,885,203	15·00	73
„ 100 „ „ 300	81,245	15·62	13,875,914	42·59	171
„ 300 „ „ 500	13,568	2·61	5,113,945	15·70	377
„ 500 „ „ 1,000	4,616	0·89	3,001,184	9·21	650
„ 1,000	603	0·12	801,852	2·46	1,330
Total	520,106	100·00	32,577,513	100·00	63

These figures indicate that 68 per cent., or more than two-thirds of all the holdings of Great Britain exceeding an acre in extent were of the type of small farms not exceeding 50 acres of land; that farms between 50 and 300 acres accounted for nearly 28½ per cent., and that the number of large farms with more than 300 acres of cultivated land formed very little over 3½ per cent. of the agricultural holdings of the country in 1895.

Taking, however, the surface farmed in each of these three

groups, the aggregate acreage occupied by holdings not exceeding 50 acres is only a little more than one-seventh, or 15 per cent. of the whole. The medium-sized farms, rising above this size but not exceeding 300 acres, cover upwards of 57½ per cent. of cultivated area of Great Britain, the larger farms accounting for the remaining 27½ per cent. of the acreage.

The last general return exhibiting like particulars for all classes of holdings was obtained ten years before on the basis of the Agricultural Returns for 1885. These annual returns are not now collected from areas of 1 acre and under, and the change, although not affecting many holdings, prevents an exact comparison between the data of the smallest class of 1 to 5-acre holdings in 1895 and 1885. Omitting this very small section of the acreage, and starting with the holdings of 5 acres and upwards, however, the following table compares the figures for 1885 and 1895 in Great Britain both as to number and acreage :—

Holdings in Great Britain.	Number.		Acreage.	
	1885.	1895.	1885.	1895.
5 to 50 acres	232,955	235,481	4,481,354	4,532,623
50 ,, 100 ,, ...	64,715	66,625	4,746,520	4,885,203
100 ,, 300 ,, ...	79,573	81,245	13,658,495	13,875,914
300 ,, 500 ,, ...	13,875	13,568	5,241,168	5,113,945
Over 500 ,, ...	5,489	5,219	4,029,843	3,803,036
Total	396,607	402,138	32,157,380	32,210,721

The changes which are thus shown are less than were expected, but the increases will be seen to occur in the smaller grades of holdings. Confining attention to those which exceed 50 acres and which may properly be regarded as distinctively agricultural, it may be noted that holdings between 50 acres and 300 acres have increased both in number and acreage, while those above 300 acres in extent have correspondingly diminished. The increase in acreage in the two groups embracing the 50 to 300-acre farms has been 356,102 acres in the ten years, while the decrease in the area of the farms lying over the 300-acre limit has been 354,030 acres. The holdings between 50 and 300 acres are more numerous by 3,582, or nearly 2½ per cent.; those above 300 are less numerous by 577, a decrease of 3 per cent.

The report and tables give in detail a variety of statistics respecting the holdings owned and occupied respectively by their owners or by tenants, and also as regards the extent of arable and grass land in the holdings of different sizes. And the investigation concludes with a special inquiry as to holdings of land of a single acre or less, including those occupied in one or other of the many forms of allotment or field garden. Many difficulties are reported as having been encountered in the inquiry of 1895 in obtaining the information respecting these areas, which are too small to be included in the annual agricultural returns, but a total of 579,133

holdings is credited to this group, and these plots are now distinguished into 37,143 single acre plots and 541,990 smaller units of cultivation. These figures compared with the separate inquiries made into the approximate number of those minute parcels of land in earlier years show some continued increase of this type of holding.

Of the 579,133 minor holdings 489,000 were in 1895 indicated as made up of allotments detached from cottages and under 1 acre in extent—a classification which, with more or less exactness of definition, had been employed on previous occasions; and, assuming the new figures to be approximately capable of comparison, the last quoted total compares with 455,000 in 1890, and with 358,000 in 1886. These figures indicate that allotments are still increasing, though less rapidly than of late. The wants of certain counties have apparently been fully met, while a tendency to the amalgamation of small plots and some surrender of allotments owing to low prices of vegetable produce is reported in others.

VII.—*The Victoria Research Fund.*

The following letter has been received by the President from Lord Lister, President of the Royal Society. It was thought that to publish it in the *Journal* would be the best method of bringing the subject before the Society.

Royal Society,
22*nd February*, 1897.

Sir,—Upon the invitation of the President and Council of the Royal Society, the Presidents of scientific Societies in London met the President and Officers of the Society on 9th February to consider whether any, and, if so, what, steps should be taken on the part of men of science to commemorate the present 60th year of the reign of Her Gracious Majesty the Queen, a period so rich in scientific discoveries. At that meeting, which was a very representative one, it was unanimously resolved:—

> That a Fund, to be called The Victoria Research Fund, be established, to be administered by representatives of the various scientific Societies, for the encouragement of research in all branches of science.

To raise a Fund of such a kind worthy of the occasion, the active co-operation of all the scientific Societies of the Empire is imperatively necessary; for the Fund, to be so worthy, must be a very large one.

It is not to be expected that scientific Societies would in general contribute out of their corporate funds, though some might be willing to do so; but rather that the several Societies should exert themselves to collect subscriptions to the Fund.

Nor is it to be expected that men of science would themselves

furnish the required sum. It is to be hoped that they would contribute so far as each felt able. But the chief gifts are to be looked for from the public, from those who are not themselves engaged in scientific inquiry, and especially perhaps from those whose wealth has been the direct or indirect result of the scientific progress of the Victorian era.

So many demands are at the present moment being made in so many ways upon the purse for the purpose of commemorating the present year, that it may be worth while to point out that, the object of the proposed Victoria Fund being a lasting one, it is not necessary that the whole Fund should be raised at once. The Fund once established might be increased by subsequent additions, and contributions might be spread over many years, or might not be called in until some future time, so that the burden in the present year might be lightened.

It is proposed that the income of the Victoria Fund should be applied to the advancement of all branches of science in all parts of the British Empire. Should therefore the project of the Fund be approved, and the Fund established, its administration will necessitate an organisation, the details of which will need most careful consideration in order that the Fund may be used in the best way in all future times; but such details may be left for the present.

I am,
Faithfully yours,
(Signed) LISTER,
President of the Royal Society.

To the President of
The Royal Statistical Society, London.

VIII.—*Note on the Teaching of the Theory of Statistics at University College.* By G. Udny Yule.

In view of the great lack of organised statistical teaching in the United Kingdom, I venture to call attention in this *Journal* to the courses of lectures on the "Theory of Statistics" that have become a permanent feature at University College during the last few years.

These courses were originally suggested by the lectures on the Geometry of Statistics, the Laws of Chance, and the Geometry of Chance, given by Professor Pearson during his tenancy of the Gresham Lectureship in Geometry from 1891-94. The first course of these lectures—which were of course of a more or less popular character—dealt with the representation and investigation of statistical problems by means of curves, diagrams, charts, stereograms, and so forth, illustrating the subject by numerous examples from sociological and physical statistics. The second year's course (1892-93) consisted of four lectures in the

Michaelmas term on the Fundamental Notions of the Theory of Probability and the Philosophy of Chance, and four lectures in the Hilary term on Chance in Artificial Problems, The Binomial Formula, &c., with examples from lottery, tossing, and roulette results. In the Easter term Professor Pearson was ill, and four lectures were given in his place by Professor Venn (on Frequency Curves), Professor Weldon (Chance in the Field of Biology), the Rev. W. A. Whitworth (on Some Points in the Philosophy of Chance), and Sir Robert Ball (Probability as the Guide of Astronomers). In the following session Professor Pearson resumed the lectures, giving three courses on Frequency Curves (Normal, Skew, and Compound), Problems in Evolution and Evolution in Man, Guessing Experiments, and Death Rates; but the work proved too great a strain on his health, and the lectureship had to be resigned at the end of the session.

In the following session however (1894-95) Professor Pearson started lecturing on the Theory of Statistics at University College, giving two hours a week to a small but enthusiastic class of two students—Miss Alice Lee, Demonstrator in Physics at the Bedford College, and myself. The course covered the Theory of Normal and Skew Variation, Dissection of Compound Normal Curves, and Theory of Normal Correlation.

This course was continued during the following session, the subjects being chiefly research work, with the Theory of Skew Correlation, and the Probable Errors of Skew Curve Constants.

In the present session (1896-97) the work has been somewhat extended. Professor Pearson has again given a course somewhat similar to that of 1894-95, and in addition I have myself given a more elementary course to some students of biology who desired special instruction with a view to the statistical treatment of problems in evolution.

The general character of the work that has been done is best illustrated by a list of the papers that have been published from the Applied Mathematics Department during the last few years.

Professor Karl Pearson. "Contributions to the Mathematical Theory of Evolution."

I.—On the "Dissection of Compound Normal Frequency Curves." *Phil. Trans.*, vol. clxxxv (1894) A, pp. 71—110. Received 18th October, 1893.

II.—"On Skew Variation in Homogeneous Material." *Phil. Trans.*, vol. clxxxvi (1895) A, pp. 343—414. Received 19th December, 1894.

III.—"Regression, Heredity, and Panmixia. *Phil. Trans.*, vol. clxxxvii (1896) A, pp. 253—318. Received 28th September, 1895.

"Note on Reproductive Selection" *Proceedings Royal Society*, vol. lix, p. 301. Received 13th February, 1896.

"On a Form of Spurious Correlation which may arise when Indices are used in the Measurement of Organs." *Proceedings Royal Society*, vol. lx, p. 489. Received 29th December, 1896.

Professor Karl Pearson and Miss Alice Lee. "On Telegony

in Man." *Proceedings Royal Society*, vol. lx, p. 273. Received 27th August, 1896.

"On the Relative Variation and Correlation in Civilised and Uncivilised Races." *Proceedings Royal Society*, June, 1897.

"On the Correlation and Variation of Barometric Heights at Stations in the British Isles." *Proceedings Royal Society*, June, 1897.

G. U. Yule. "On the Correlation of Pauperism with Proportion of Out Relief." I.—"All Ages." *Economic Journal*, vol. v, p. 603. December, 1895.

Ditto. II.—"Males over Sixty-five." *Economic Journal*, vol. vi, p. 613. December, 1896.

"Notes on the History of Pauperism," &c., &c. *Journal of the Royal Statistical Society*, June, 1896.

On the "Significance of Bravais' Formulæ for Regression, &c., in the case of Skew Correlation. *Proceedings Royal Society*, vol. lx, p. 477. Received 14th December, 1896.

In the session 1897-98 it is proposed to give four hours again to the teaching of Theory of Statistics; but the details as to times, subjects, and divisions into lectures or practical classes will be left to be settled according to the needs of students. It will be understood that the lectures will not be given up to the study of any one subject in practical statistics, but solely to the general theory of statistics—the theory of probability in its application to the study of frequency distributions, averages, and correlations. Some knowledge of mathematics is of course necessary for following such a course, say, as a minimum for elementary lectures, algebra up to the binomial and exponential theorems. Any students who would care to attend such a course might communicate with Professor Pearson or myself. We do not expect many students, but it is rather an advantage than otherwise, that "Theory of Statistics" is not yet an examination subject, and so only those study it who are really desirous of knowledge.

In the practical classes mentioned above, numerical examples will be worked out in full by the students, for illustrating the subjects dealt with in the lectures. Students will also have an opportunity for practising the use of tables, arithmetic machines, slide rules, &c., for abbreviating calculations, and in the plotting of curves from their equations for the representation of theoretical results, and similar work.

IX.—*Notes on Economical and Statistical Works.*

Life and Labour of the People. Vol. ix. Edited by Charles Booth. Crown 8vo., 454 pp. 7*s.* 6*d.* London: Macmillan and Co., 1897.

The publication of this volume marks the completion of another stage in the great work undertaken by Mr. Booth, and a considerable part, more than one-fifth, of the volume is occupied with an

abstract of the contents of the whole series so far as completed, from vol. i to the present. This abstract is preceded by seven chapters, in which important features of the inquiry are brought together and trade is compared with trade, central London with the outer ring, in respect to these features. Every chapter contains features which might justly be noticed here, and the difficulty is one of selection between conflicting interests. Perhaps the most interesting chapters are those which deal with the ages of those engaged in different trades, and which show how the changes which are passing over the area dealt with, and which have produced alterations of importance in some cases during the period of the inquiry, affect different trades. Some of the special features of women's trades and the conditions under which they are employed, are strikingly illuminated by the facts of the ages of the employed. We must not omit, too, to notice the almost startling feature which is clearly brought out, that the characteristic of the industries of London is, not the immense size of the undertakings, which has been supposed to be the distinctive feature of modern industrial developments, but the immense number of small undertakings.

The latter part of the volume is devoted to the survey and conclusions of the work so far as it has gone. It is largely the work of Mr. Ernest Aves, and constitutes one of the most valuable studies of modern industrial life which can be found in the English, perhaps in any, language. Though dealing with London principally, what is contained in these thirteen chapters has very important bearings on other great centres of industry, even though they lack all the really characteristic features which make London a case apart from all others. While the work done on London under Mr. Charles Booth's direction has caused many to wish that other great centres of trade and industry could be subjected to similar exhaustive study, the volume now before us supplies a general treatment of modern society from its industrial side which is applicable not only to other parts of England, but in some respects to other countries as well, though it applies specially to London and grows out of the exposition of London's work and needs. It would be worse than futile to attempt to give any summary of this part of the volume. It may be read and re-read with advantage by those who desire to understand the life which surrounds them; whether the reader agree with the author as to the true place and utility of the trade union, as to the desirability or otherwise of a specific interference on the part of Government, &c., &c., or whether he do not so agree, he cannot fail to gain insight into the fundamental features of modern industrialism, and to be in a better position than before to consider the balance of gain or loss arising from any actual or proposed arrangement.

Each chapter is preceded by a careful analysis of its contents, and the volume concludes with an exhaustive index.

We think our readers will be interested to know, that if they possess the original edition of the first part of the work, they may exchange those two volumes, free of charge, for the first four volumes of the later edition by application to the publishers.

Domesday Book and Beyond. By Frederick William Maitland, LL.D. Cambridge University Press, 1897.

The *History of English Laws before the time of Edward I*, which appeared in 1895 under the joint authorship of Sir Frederick Pollock and Professor Maitland, has shown us what we may expect from the distinguished author of this book. The volume before us contains three essays, on *Domesday Book*, *England before the Conquest*, and *The Hide* respectively, which were originally in preparation for the work mentioned. In the first essay we learn not only what *Domesday Book* can tell us as to the condition of England in 1086, but we are further instructed as to what cannot be expected from that compilation, for reasons connected with the purposes with which it was drawn up. The information which it can give as to the relation of class to class, except so far as that is involved in questions of payment of geld, will be unlikely to be as full and precise as we could wish. So far as concerns relations which do affect geldability, the information afforded is examined, sifted, rearranged and made to give us a picture of the growth of the state of society which the Conqueror found, and of the nature of the changes which were going on in that society. In particular, the question of relative degrees of freedom is examined, and the impression produced is that the usual accounts of Saxon and early Norman England exaggerate the dependence of the mass of the tillers of the soil. But in reply to the question whether the study of ancient documents reveals to us a land of free village communities, we do not find the answer which might be expected from this last statement. If the villagers had been freer in Saxon times than they became in Norman times, that freedom was not associated with community of ownership. Rights of property, unless we fail to understand our author, were individual rights. Common cultivation is referred to thus: "The practice of 'co-aration' need not be enforced by law; the man who will not help his neighbours must be content to see his own land unploughed." The growth of seignorial power is traced, and at any rate a large part of the process of increasing subjection of the people to the lords is pictured to us. The degradation of the status of the villagers is emphasised, with the fact that the thirteenth century conditions are by no means a fair reflection of what preceded.

By no means the least noteworthy feature of the second essay is the inquiry contained in it with reference to the origin of the "Borough." The view set forth is that the typical borough is, in origin, a fortified place, the "haws" in it being occupied and maintained at the expense of the different tenants in the district around it. There the king's peace reigns, and, in the protection of that peace, a market may be established. As development proceeds, the traces of the early origin may fade, but the features which differentiate a borough from an ordinary *vill* may be largely explained if the view of the borough just stated be taken as the basis and starting point. Several of the most prominent difficulties in interpreting known facts in accordance with this view are discussed by the author, who frankly acknowledges that all is not clear, while he shows how strikingly his theory is in accord with,

and throws a most instructive light upon, a great part of what is known of the early history of boroughs.

The statistics afforded by the Domesday survey are examined to provide an answer to the question of the size of the "hide." The learned Professor makes it clear that there is a good case for taking 120 acres as the answer, and in the course of his argument repeatedly gives important warnings against hasty and superficial views of the history of the period dealt with. The conceptions of the people with whom that history is concerned are often as far from those of later times as those of a child are from those of an adult. If we would truly understand our forefathers, we must endeavour to think their thoughts.

There is one point to which we may give a few words, and that is the discussion of the probable cultivated area of England in the Conqueror's time. Professor Maitland gives us some warnings which seem most necessary, in view of the calculations of Thorold Rogers of the amount of cultivated land and the possible population which it could support. The acre is not a definitely constant measure, we do not know whether one-half, one-third, or two-thirds of the arable soil was yielding crops at the same time in many places, provision for feeding cattle has to be made, and also for raising the barley from which to brew the national beverage, and, of extreme importance, the minimum yield of a bad year, not the average crop, is the measure of the feeding power of the land. Other considerations of importance are also mentioned, but this last is one which has been too much overlooked, and to which attention is very necessary.

The lucidity of the style in which this book is written is not the least of its merits, and from every point of view it forms a most welcome addition to the literature which deals with the economic conditions of our distant forefathers.

Juvenile Offenders. By William Douglas Morrison. Crown 8vo., 317 pp. 6*s*. London: T. Fisher Unwin, 1896.

This new volume of the Criminology Series is a careful study of the extent and causes of youthful criminality, and of the methods which are in use for the purpose of checking this social evil. It becomes clear as we pass from chapter to chapter that we are considering a morbid development of social life which is tending to be accentuated by the concentration of population in great industrial centres. If, as our author is convinced, and as he appears to establish, the increase of crime tends inevitably to accompany such concentration, it becomes of the utmost importance to study how best to check at its principal source the increase of the criminal section of society.

In the first part of the volume facts are adduced, and critically examined, which lead to the conclusion that crime is increasing, and not least among juveniles; that boys contribute in far greater proportion than girls to this result, though the disparity is decreased in cases where, as in London, and still more in Manchester, the social and economic conditions of the sexes are more nearly equalised than in the country at large; that juvenile

criminality is associated with loss of one or both parents, or with lack of parental care though both parents be alive, in a very high degree; and, further, that physically these young criminals fall below the average of development attained by others of equal age in the same place, they are, in fact, degenerates both in physique and in *morale*, they are tainted lives, and their social and economic conditions contribute to develop the defects inherent in them. All these statements are general, referring to majorities, not to universal conditions.

In Part II the modes of repression of juvenile crime are examined, and the author expresses his views as to the best directions for improving them. He would have the method of conditional release more extensively employed, would have reformatory institutions available for ages up to 23, would raise the age of admission to industrial schools, and hand over the very young, especially when no actual offence has been committed, to institutions under the educational rather than under the criminal or pauper authorities. Within corrective institutions themselves greater individualisation is advocated, different ages and different classes of offence, for example, not being subjected to the same uniform treatment. For this purpose the smaller institutions are more effective, from the nature of the case, than the larger. We have only slightly indicated some of the more prominent points which have struck us in going through Mr. Morrison's book, which is worthy of careful study, and brings together a quantity of very useful material, the critical examination of which is of extreme importance, dealing as it does with a matter so vital to the future of all industrial communities.

Speculation on the Stock and Produce Exchanges of the United States. By Henry Crosby Emery, Ph.D. $1·50. New York: The Macmillan Company, 1896.

This study of speculation and its effects is by no means one of the least useful of the publications of the Faculty of Political Science of Columbia University. Considering the widely divergent views on the effects of speculation which are held by business men, some regarding it as the bane of modern business life, others as the most useful and indispensable of modern institutions, there is clearly room for a dispassionate examination of the matter.

Dr. Emery begins by describing the organisation and business methods of the exchanges, thus enabling his non-expert readers to understand how the business is carried on, and, incidentally, to realise better the difficulties of checking mischievous speculation by legislation which shall not at the same time put a very serious check on lawful business, using this term in its usual, everyday, non-technical sense.

It will be useful to quote the author's statement of what he conceives to be the function of speculation. It is: "To relieve trade of the risks of fluctuating values, by providing a class always ready to take or deliver a property at the market price; and, in so doing, to direct commodities to their most advantageous uses, and the investment of capital into the most profitable

channels, by fixing for commodities comparative prices for delivery at different times and places." He adds: "The directive influence of speculation is its service to society in general, and its risk-bearing function its service to trade as such." These propositions are examined in detail, and opposite views are not put aside without reason given. In considering the farmer's position it is pointed out that the futures-market must not be blamed for the fact that farmers attempt to carry on business for which, as farmers, they possess absolutely no qualifications—the business of speculation. The power to sell ahead on a good market is what the futures-market gives the farmer, and it also enables him to borrow readily against his crop, a facility of borrowing which, to shiftless farmers, has proved ruinous, but which is, on the whole, of great benefit.

To the allegation that speculation lowers permanently the level of the price of the articles dealt in, it is objected that, when carefully considered, the sources of the power to do this are not easy to find. "Manipulation" requires immense capital, coolness, and courage and the greatest practical skill, and is rarely successful. That speculation does bear in its train some real and serious evils is not denied. The difficulty is to determine "at just what point the evil of public speculation becomes too high a price to pay for the advantages of the active market."

The final chapter is occupied with a consideration of the attitude of the law in the United States towards speculation, and also contains an account of the recent reform of the German Bourse law. The footnotes throughout are rich in references to German and other writers who have devoted special attention to the subject of this essay.

Atlas Graphique et Statistique de la Suisse. Berne, 1897.

The statistical department of the Swiss Federal Government has issued under this title a useful series of diagrams, illustrative of the present and past condition of the country. They include diagrams dealing with the vital statistics, railways, telegraphs, foreign commerce and public finance of the country, together with some other matters of less general interest. The contrast between the age distribution in the towns and in the country districts is, as usual, strongly marked, and in considering the cantons one by one, there are some very remarkable and unusual peculiarities brought to light. In dealing with suicides, a very notable difference between those who have been widowed or divorced and the rest of the population is shown. The frequency of suicides among the widowed greatly exceeds that among married or single, but is itself in turn greatly exceeded by the frequency of suicides of divorced persons.

The principal sources of imports and destinations of exports are shown on cartograms, and the whole series presents the leading statistical facts of the federation in the most striking form to the eye.

The explanation of the diagrams and the introduction is in French and German in parallel columns. The figures of age and

sex-distribution of the population are not included, which is to be regretted.

Industry in England. By H. de B. Gibbins, M.A. Crown 8vo., 479 pp. London: Methuen and Co., 1896.

The small volume by the same author entitled *The Industrial History of England* appears to have been expanded into the somewhat pretentious (in appearance) work now issued. The defects of the earlier work remain for the most part in the present. The want of due proportion between the amount of space devoted to different stages of national industrial development is not remedied. In the smaller volume much might be overlooked for the sake of having within so moderate a space the outline of industrial history which it supplied. With this more bulky work the same excuses, the same reasons for accepting excuses, are no longer valid. Mr. Gibbins expresses a hope that his "survey of the origin of the manor" may be some contribution to the discussion of the subject. That hope can hardly be considered as realised. The student of the latest works of the greatest authorities will not find their accounts and views quite in agreement with those of Mr. Gibbins.

We would not be understood to suggest that the volume before us has not been compiled with very great care; of that it bears abundant evidence. It is hardly possible, however, to put aside in a few lines the opinions of well known writers such as Professors Cunningham and Ashley. If readers of this volume assume it to be of equal authority with the works of these two writers, they will err, and it is not easy to see what they will have gained by their perusal of its pages. It is no longer a question of an introduction to a fascinating subject, which may stimulate the reader to pursue his studies and consult the great writers.

Cours d'Économie Politique. Vilfredo Pareto. 2 vols., 8vo Lausanne: F. Rouge, 1896 and 1897.

The scheme of the course contained in M. Pareto's two volumes varies somewhat from that commonly adopted in economic treatises. Beginning with an exposition of the principles of the pure theory of economics, the author proceeds to clothe the skeleton which he thus obtains by introducing the limitations and modifications which an examination of the facts of the actual business world requires.

The statement of the theoretic outlines is clear, and in substantial agreement with the views of the modern leaders of English economic thought. Abundant foot notes give interpretations into mathematical form of the theorems enunciated, and afford to those who are able to use this notation the advantage of a brief and clear statement of the principles laid down in a form peculiarly well adapted for logical examination.

We then come to the second part of the treatise, comprising by far the greater quantity reckoned by pages, which is denominated "Applied Political Economy." In the chapter on "personal capital" we have a study of vital statistics, abundantly furnished with tables of figures. Then follows a chapter on money, with a

careful analysis of different possible and actual monetary systems, and an account of price variations in the past, a chapter on saving and one on banks; and vol. i concludes with a chapter on *les capitaux fonciers.*

In the second volume the matter is divided into two parts, the first of which deals with the economic organism, a phrase which has become somewhat nauseating to English ears by its constant misuse. A discussion of social evolution is followed by chapters on "production," "commerce," and "economic crises." It will be seen that the order of the material differs somewhat from that in English text-books. The latter part of the volume treats of "distribution and consumption." This is, on the whole, somewhat disappointing, except for the exposition of the author's theory concerning his *courbe des revenus*, which occupies nearly the whole of the space. We had hoped for a treatment of distribution on some other lines than those adopted. This *courbe des revenus* however, is a matter of some importance. M. Pareto conceives that he has established from recorded facts that the composition of society, so far as the proportions between persons enjoying incomes of various amounts is concerned, is practically unvaried as we pass from country to country and from age to age. The industrial army, if we may be allowed to force an analogy, contains everywhere and at all times about the same proportions of privates, non-commissioned officers, and superior officers in various ranks. While we would not propose here to express dissent from that view, we doubt whether the English income tax assessments may be taken as an accurate and tolerably complete representation of the family or individual incomes of the nation. Reflections on what these returns are and what they do not even profess to be justify such a doubt. Whether the returns from other countries and ages are more accurately representative of the real distribution of wealth we do not venture to say. One thing M. Pareto has done, and that is to point out what kind of information these records may contain if properly examined.

An Essay on the Present Distribution of Wealth in the United States. By Charles B. Spahr, Ph.D. New York, 1897. 180 pp.

It is the opinion of Dr. Spahr that "in matters coming within its field, the common observation of common people is more trustworthy than the statistical investigations of the most unprejudiced experts." (Preface). Fortunately, or unfortunately, his conviction that there is this more excellent way, has not prevented him from pursuing on the whole the familiar course of statistical investigators. "Common observation" and "common sense" are only cited (as on pp. 124, 155) where there is enough of other testimony to make the argument complete without them, or (as on p. 14) where they are declared untrustworthy. What Dr. Spahr really meant by the assertion of the preface was probably what he states on p. 19, that he has learned "to distrust the statistical work of those not personally familiar with the conditions discussed"—a distrust with which most of us will sympathise.

Before dealing with his own country, Dr. Spahr briefly examines

the state of things in Europe, especially in England. He gives reasons for differing from Mr. Giffen as to the comparative gains of the rich classes and the poor by the progress of the last half century. "We find that less than 2 per cent. of the families of the United Kingdom hold about three times as much private property as all the remainder, and that 93 per cent. of the people hold less than 8 per cent. of the accumulated wealth" (p. 23), whereas in 1838, according to Porter's *Progress of the Nation*, the disproportion was less and not greater (p. 17). In America the disproportion exists, too, though nearly all American citizens are holders of property, in one shape or another, and both the number of millionaires and the amount of their wealth have been greatly exaggerated (p. 67). "Less than half the families in America are property-less; nevertheless, seven-eighths of the families hold but one-eighth of the national wealth, while 1 per cent. of the families hold more than the remaining 99" (p. 69).

The second half of the book is devoted to a discussion of the relative incomes of various classes, especially capitalists and labourers, both here and in the United States, and to a view of taxation, both local and national. Dr. Spahr is a defender of the much abused property tax (ch. viii, 146 *seq.*). He considers that the indirect taxation from which the Union gets nearly all her revenue falls chiefly on the poor. Of the aggregate amount raised by the taxes on liquor, tobacco, and sugar (these three furnishing nineteen-twentieths of the whole)—the poor pay in the case of liquor three-quarters of the total, in the case of tobacco two-thirds, while the tax on sugar being *per capita* is paid in greatest part by those who are the greatest part. Even the tax on clothing is paid three-fifths by the poor, and only two-fifths by the well-to-do (pp. 142 and 3). Dr. Spahr's sketch of the economic effects of the abolition of slavery on the distribution of wealth in South and North will give new light to many of us (pp. 27—40, *cf.* 147).

His opinions, even when debateable, are always worth debating, for example, that a centralised government tends necessarily to favour aggregation of wealth in few hands (p. 27), and that it is neither necessary nor desirable, when a State is becoming "settled," that personalty should increase faster than realty (p. 146). The book is a small book but a strong book.

Documents sur la question du Chômage. Office du travail, Ministère du commerce, de l'industrie, des postes, et des télégraphes. 398 pp. Paris: Imprimerie Nationale, 1896.

The body that corresponds in France to the Labour Department of our Board of Trade has collected in this stout quarto buff book various materials for forming a judgment on the question of the unemployed. A Bill is before the Chamber proposing that public aid in the form of relief works be granted to those who are unemployed during industrial crises from no fault of their own. The Bill consists of four clauses. The first invites municipalities (*communes*) to reserve for times of exceptional distress such works of public utility as can be put off and taken up again

without public prejudice—the examples being construction and maintenance of roads and drains, clearing and afforesting, dredging, and irrigation. The second authorises them to devote for the purpose of such works a yearly sum proportioned to the number of inhabitants, and to allow these yearly sums, when not needed, to accumulate and form a reserve. The third prescribes residence as a condition of relief. The fourth lays on the municipal authorities the duty of fixing the wages and hours of labour, but prescribes that the rate of wages shall be no higher than is customary for similar work done under normal conditions.

The Bill and its preamble (*exposé des motifs*) are followed by six different documents. There is an analysis (1895) of the method and results of the Swiss system of insurance, where the workmen contribute to the amount insured, but their contributions are supplemented by the State or municipality (pp. 13—44). There is much more about the method than about the results, which are generally believed to be not entirely encouraging (see p. 39). Similar experiments in Italy and Germany are also noticed in this connection.

The second of the six papers is an official memorandum (1895) of the Labour Department on the provision made by trades unions for members out of work (45—76). The facts for England are drawn from the reports of our Labour Department, and occupy the foremost place. There is also a full account of the practice of various French unions.

The third is a similar memorandum (1895), on what we call relief works, as carried out in various French Departments (77—154). It includes the experiments of the revolutionary government (1789-92), and of the republic of 1848. A long account is given of the measures adopted by municipalities at the present time, or to speak more strictly from 1890 to 1894. French experience is in favour of piecework in such cases, and of limiting the hours of labours in such a way that the "unemployed" may be able and willing to seek employment of the ordinary sort (153). It seems on the whole to have been less unhappy than the English experience. The report of our Labour Department on the unemployed (1893) is quoted at length (155—168), and the history is brought down to 1895 (162—173). The United States are dismissed briefly (173—5). Appended to this third document is a conspectus of the sums spent on relief works by the principal towns in France between 1890 and 1894 inclusive (177—185). Then follows the fourth document, which deals with the efforts of voluntary associations giving charitable relief under a labour test or in labour colonies (187—215). The fifth document (272—317), on the statistics of the unemployed, and the sixth (318—383), on the causes, are perhaps the most interesting of the whole collection. The general conclusions are (304) that the extent and duration of the involuntary idleness are very different in different trades and professions, at different times of the year, and in different years of a series, and that they are not the same for different countries. The proportion of unemployed per annum is from $2\frac{1}{2}$ to 10 for the United States, 8 to 9 in Great Britain, and 12 per cent.

in France. In spite of the finely traced curves and impressively marshalled figures, the thought will occur to many readers that Massachusetts, English, and Belgian statistics as well as French cannot be a basis of safe conclusions till they can be made more uniform in principle, applied to the same periods, and collected and verified with approximately the same thoroughness.

Statistical and Economical Articles in Recent Periodicals.

United Kingdom—

Economic Journal. March, 1897—Agrarian Reform in Prussia: *Prof. L. Brentano.* Mr. Chamberlain and Colonial Commerce: *K. B. Murray.* British Trade and German Competition: *A. W. Flux.* The Pure Theory of Taxation: *Prof. F. Y. Edgeworth.* The Unemployed Problem in Basle: *W. H. Dawson.* The Silver Question in the United States: *Prof. W. Fisher.* Some recent Labour Disputes: *E. Aves.* The Recess Committee and remedial legislation for Ireland: *The Hon. H. Plunkett.*

Economic Review. April, 1897—Agricultural Norway: *R. Hedge Wallace.* What are the Interests of Shareholders?: *Helen Dallas.* Moral Limitations of State Interference. II: *E. F. B. Fell.* The Agricultural Labourer: A Reply: *J. C. Medd.*

United States—

American Statistical Association Publications. March, 1897—Remarks of President Walker at Washington. Vital Statistics for the Twelfth United States Census: *C. L. Wilbur.* The Vital Statistics of the Census: *W. A. King.* General Francis A. Walker [Obituary Notice].

Annals of the American Academy of Political and Social Science. May, 1897—Silver in China: *T. Williams.* State constitutions of the American Revolution: *W. C. Webster.*

Journal of Political Economy. March, 1897—Greenbacks and the cost of the Civil War: *W. C. Mitchell.* Credit Instruments in business transactions: *D. Kinley.* The assessment of taxes in Chicago: *R. H. Whitten.* Trade-Union Organisation in the United States: *W. L. M. King.* England's dominant industrial position: *C. Zueblin.* Francis Amasa Walker: *J. L. Laughlin.* Gold and Silver in Terms of Commodities: *E. S. Meade.*

Political Science Quarterly. March, 1897—James Wilson and the Constitution: *Prof. A. C. McLaughlin.* Four German Jurists. III: *Prof. M. Smith.* The Process of Social Change: *C. H. Cooley.* Classification in Public Finance: *Prof. C. C. Plehn.* Agricultural Discontent. III: *C. F. Emerick.*

Quarterly Journal of Economics. April, 1897—The safety of the legal tender Paper: *C. F. Dunbar.* The Birth-rate in Massachusetts, 1850-90: *F. S. Crum.* Co-operative stores in the United States: *E. Cummings.* The steadily appreciating standard: *C. M. Walsh.* The taxation of sugar in the United States, 1789-1861: *C. S. Griffin.*

UNITED STATES—*Contd.*

Yale Review. May, 1897—Limits of Constitutional Law: *T. Thacher.* Street Railways and their relation to the Public: *C. E. Curtis.* The Rationale of Congressional Extravagance: *R. Ogden.* The Massachusetts Farmer and Taxation: *C. S. Walker.*

FRANCE—

Annales de l'École Libre des Sciences Politiques, 1897—

March — Un ménage royal au commencement du siècle (1794-1820): *O. La Chèvre.* Louis Blanc et la Commission du Luxembourg: *G. Cahen.*

May—Les finances espagnoles: *R. G. Lévy.* La Chine, l'Angleterre et la Russie en Asie centrale: *F. Grenard.* De l'état présent et prochain de l'ouvrier américain (*to be continued*): *E. Levasseur.*

Journal des Économistes, 1897—

April—Le "Negro Problem" aux États-Unis: *G. de Molinari.* Les chambres de compensation et les caisses de liquidation (*continued in June*): *G. François.* Le referendum au point de vue économique: *V. Pareto.*

May—L'Assemblée constituante et les Biens du Clergé: *C. Gomel.* Le Solidarisme, la Science économique et les Doctrines sociales: *H. Léon.* Sur la Théorie Marxiste de la valeur: *G. Sorel.*

June—Lettres inédites de J. B. Say. Commerce extérieur et fluctuations du change: *A. Raffalovich.* Notes sur les États-Unis: *A. Viallate.*

Journal de la Société de Statistique de Paris, 1897—

April—Les bénéfices comparés du travail et du capital dans l'accroissement des richesses depuis 50 ans. (Tableaux): *F. de Flaix.* Statistique des sociétés savantes: *Dr. J. Bertillon.* Mouvement de la population de la France en 1895.

May—De la classification et du rôle de la statistique parmi les sciences sociales (*concluded in June number*): *R. de la Grasserie.* Les émissions et remboursements en 1896 d'obligations de chemins de fer: *A. Neymarck.*

June—De l'inégalité de la répartition des bénéfices du travail et du capital dans l'accroissement de la richesse depuis 50 ans: *C. Juglar.* Le mouvement des billets de la Banque de France: *A. Neymarck.* Chronique de statistique sur les questions ouvrières et les assurances sur la vie: *M. Bellom.*

La Réforme Sociale. Nos.—

28—La réforme des droits de succession: *A. Simonin.* Le minimum de salaire en Belgique (*concluded in No.* 29): *L. Le Foyer.*

29—Une citadelle socialiste—Le Vooruit de Gand (*concluded in No.* 30): *J. Van den Heuvel.* Pourquoi la criminalité monte en France et baisse en Angleterre (*concluded in No.* 30): *E. Rostand.*

30—Voyage social en Allemagne: *G. Blondel.* Les marchés à livrer fictifs (*continued in No.* 31): *A. Paisant.*

FRANCE—*Contd.*

La Réforme Sociale. Nos.—Contd.

32—La vie au Transvaal.—Le cafre ouvrier dans les mines d'or (*concluded in No.* 33): *P. le Play et G. Verstraete.* L'impôt global: et l'inquisition fiscale dans l'état d'Ohio: *R. de Kerallain.*

33—L'arrêt dans la population française, ses causes dans le passé, ses effets dans l'avenir: *A. des Cilleuls.*

Revue d'Économie Politique, 1897—

March—La loi de Gresham et ses rapports avec le Bimétallisme: *H. D. Macleod.* Frappe clandestine et frappe libre: *M. Rochussen.* Corrélations financières de l'indice céphalique: *G. de Lapouge.*

April—Quelques fabriques modèles en Angleterre: *A. S. Levetus.* Étatisation de la boulangerie: *V. Till.* Le travail du Dimanche en Belgique et l'état des législations étrangères sur la matière (*continued in May*): *E. Dubois.* La durée du travail dans l'industrie française de 1820 à 1870: *C. Rist.*

May—Étude critique sur le troisième volume du "Capital" de Karl Marx: *L. Winiarsky.* La loi de l'offre et la monnaie: *A. Landry.*

GERMANY—

Archiv für Soziale Gesetzgebung und Statistik. Band 10, 1897—

Heft 3—Die neuen statistischen Erhebungen über Arbeitslosigkeit in Deutschland: *Dr. G. Schanz.* Die Wiener Enquête über Frauenarbeit: *Dr. L. Schüller.* Das Frauenstimmrecht in England: *Lily Braun.* Die Versorgung der Arbeiterwittwen und-Waisen in Deutschland: *H. von Frankenberg.*

Heft 4—Das Sweatingsystem in der Konfektion und die Vorschläge der Kommission für Arbeiterstatistik: *Dr. A. Weber.* Der Entwurf zur Abänderung der deutschen Gewerbeordnung: *Dr. C. Neuburg.* Das österreichische Heimatrecht und seine Reform: *Dr. J. Redlich.*

Heft 5—Der Hamburger Strike von 1896-97: *Dr. F. Tönnies.* Die Stellung der Heimarbeiter im Deutschen Gewerberecht: *M. von Schulz.* Die Statistik der Unfall-, Invaliditäts-, Alters- und Krankenversicherung im Deutschen Reich für das Jahr 1894: *Dr. E. Lange.*

Jahrbuch für Gesetzgebung, Verwaltung, &c., Heft 2, 1897—Aussenhandel und Valutaschwankungen: *K. Helfferich.* Über den wirtschaftlichen Entwickelungsgang Bulgariens: *M. Ströll.* Die Lage des Bauernstandes in Rumänien. Einflüsse des Lebensraums auf die Gestaltung der Bevölkerungsverhältnisse im Herzogtum Braunschweig: *F. W. R. Zimmermann.* Bericht über die 16 Jahresversammlung des Deutschen Vereins für Armenpflege und Wohlthätigkeit: *E. Münsterberg.* Die Arbeiterversicherung in den europäischen Staaten: *F. Berghoff-Ising.* Die Carl Zeiss-Stiftung, ein Beitrag zur Fortbildung des grossindustriellen Arbeitsrechts: *J. Pierstorff.* Die Wahrheit im Streik der Hafenarbeiter und Seeleute in Hamburg im Jahre 1896-97.

GERMANY—*Contd.*

Jahrbücher für Nationalökonomie und Statistik, 1897—

March—Zur Bevölkerungsgeschichte des Altertums: *J. Beloch.* Die Statistik der Arbeitseinstellungen: *V. Mataja.* Die Entwickelung des Brennereibetriebes im deutschen Branntweinsteuergebiete von 1831-94. Verunglückungen auf deutschen und englischen Eisenbahnen. Die agrarstatistischen Erhebungen in den Vereinigten Staaten von Nordamerika: *J. Conrad.*

April—Ueber die Frequenz der deutschen Universitäten in früherer Zeit: *F. Eulenburg.* Die Preise in den Jahren 1895 und 1896 verglichen mit den Vorjahren. Japans wirtschaftliche Kulturentwickelung und sein Preisniveau: *J. Wernicke.*

May—Der Ausstand der Hamburger Hafenarbeiter 1896-97: *R. Ehrenberg.* Ueber die Theorie einer "kollektivistischen" Geschichtswissenschaft: *F. Rachfahl.* Die landwirtschaftliche Verschuldung im Grossherzogtum Oldenburg: *P. Kollmann.* Die Bedeutung des Reichsinvalidenfonds für den preussischen Kommunalkredit: *W. Kähler.* Ueber die Möglichkeit eines Wertmasses: *L. Fick.*

Vierteljahrshefte zur Statistik des Deutschen Reichs, 1897. *Heft* 2—Die Einwirkung der Versicherungs-Gesetzgebung auf die Armenpflege. Produktion der Bergwerke, Salinen und Hütten, 1896. Verkehr auf den deutschen Wasserstrassen 1872-95. Verkehr im Kaiser-Wilhelm-Kanal während des Etatsjahres 1896-97. Die Bevölkerung nach der Volkszählung vom 2 Dezember, 1895. Zur Statistik der Krankenversicherung (1895 und 1890-95). Auswärtiger Handel des deutschen Zollgebiets im Jahre 1896.

AUSTRIA—

Statistische Monatschrift, 1897—

January Heft—Ernteergebnis der wichtigsten Körnerfrüchte im Jahre 1896. Der Clearing- und Giro-Verkehr in Oesterreich-Ungarn und im Auslande (*concluded in next number*): *Dr. H. Rauchberg.* Die Feuer- und Hagelschäden Oesterreichs und deren Versicherung in den Jahren 1891, 1892, und 1893, im Vergleiche mit den Vorjahren: *K. Kraft.*

February-March Heft—Die statistischen Ergebnisse der Landtagswahlen des Jahres 1895 und 1896. Die Reorganisation der Statistik der Bevölkerungsbewegung: *Meinzingen.*

ITALY—

Giornale degli Economisti, 1897—

April—L'elemento soggittivo nella teoria del valore: *V. Crocini.* Lo sviluppo della rete ferroviaria degli Stati Uniti e le sue variazioni (*continued in next number*): *L. Barberis.* Della base economica della storia (*continued in June*): *A. Contento.*

June—Le modificazioni alla imposta sui redditi di ricchezza mobile: *A. De Viti de Marco.* Osservazioni sulle "Modificazioni alle vigenti leggi sull' istruzione pubblica" proposte dal ministro Gianturco: *M. Pantaleoni.*

SWITZERLAND—

Journal de Statistique Suisse. 1897—

Lief. 1—Die Zahl der Studenten und Zuhören an den schweiz. Universitäten und Akademien im Winter 1895-96 und im Sommer 1896. Die tödlichen Unglücksfälle in der Schweiz während des Jahres 1895. Die Ferienkolonien für arme Schulkinder in der Schweiz in den Jahren 1891-95. Die freiwilligen Armenerziehungsvereine der Schweiz: *K. Schweizer.* Wesen und Ziele der modernen Arbeiterschutzgesetzgebung: *Dr. N. Reichesberg.* Dr. Ernst Engel.

Lief. 2—Schweizerische Unfallversicherung auf Gegenseitigkeit: *Dr. H. Wegmann.* Die volkswirtschaftliche Bedeutung der Schmalviehhaltung für die Schweiz: *Dr. H. Anderegg.*

X.—*Quarterly List of Additions to the Library.*

Additions to the Library during the Quarter ended 15th June, 1897, *arranged alphabetically under the following heads:*—(a) *Foreign Countries;* (b) *India and Colonial Possessions;* (c) *United Kingdom and its Divisions;* (d) *Authors, &c.;* (e) *Societies, &c.* (*British*); (f) *Periodicals, &c.* (*British*).

Donations.	By whom Presented (when not purchased).
(a) Foreign Countries.	
Argentine Republic—	
Commerce extérieur argentin. Année 1896. No. 92. Importation et Exportation en 1895 et 1896	The Director-General of Statistics
Higiene. Anales del Departamento Nacional de. (Current numbers)	The Department
Mendoza. Higiene aplicada. Saneamiento de la Provincia de Mendoza por el Dr. E. R. Coni. Plates, la. 8vo. 1897	The Provincial Health Department
Tucuman. Anuario de Estadistica de la Provincia de Tucuman correspondiente al año 1895. Diagrams, 2 vols. 8vo.	The Provincial Statistical Bureau
Buenos Ayres (*City*). Monthly Return of Municipal Statistics. (Current numbers)	The Municipal Statistical Bureau
Austria-Hungary—	
Ackerbau-Ministeriums. Statistisches Jahrbuch für 1895. Heft 2. Der Bergwerksbetrieb œsterreichs im Jahre 1895. Lief 2	The Ministry of Agriculture
"Austria." Archiv für Gesetzgebung und Statistik auf den Gebieten der Gewerbe, des Handels und der Schiffahrt. (Current numbers.) 8vo.	The Statistical Department, Ministry of Commerce
Ausweis über die monatl. Durchschnittspreise von Weizen, Korn, Gerste, Hafer, und Mais in Marktorten. (Current numbers.) Sheets	The Central Statistical Commission
Consulats-Behörden. Jahresberichte der k. und k. österr.-ungar. (Current numbers.) 8vo.	The Statistical Department, Ministry of Commerce
Handel. Statistische Übersichten betreffend den auswärtigen, des österr.-ungar. Zollgebiets. (Current monthly numbers)	

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(a) **Foreign Countries**—*Contd.*	
Austria-Hungary—*Contd.*	
Handels. Statistik des auswärtigen, des österr.-ungar. Zollgebiets. Jahre 1895. Band 3, Vormerkverkehr, Durchfuhr. 8vo.	The Statistical Department, Ministry of Commerce
Handelsbewegung. Berichte über die, sowie Bewertung der im Jahre 1895 ein- und ausgeführten Waren des österr.-ungar. Zollgebiets. 8vo.	
Oesterreichische Staatshaushalt in 1893 und 1894	The Central Statistical Commission
Rechtspflege. Statistik der, 1893. Heft 2. Ergebnisse des Concursverfahrens	
Rechtspflege. Statistik der, 1894. Heft 5, Civilgerichtliche Depositenwesen, Cumulativen Waisencassen, &c.	
Sparcassen. Statistik der, für 1894	
Statistische Monatschrift. (Current numbers)	
Verkehrs. Statistik des, für 1894 und 1895. Abth. 1. Landstrassen, Wasserstrassen, Flussschiffahrt	
Budapest. Statistisches Jahrbuch der Haupt- und Residenzstadt Budapest. Jahrgang i, 1894. (Mit Rückblicken auf die Jahre 1874-93.) La. 8vo.	The Municipal Statistical Bureau
Brünn. Statistischer Wochenbericht . . . der Landeshauptstadt Brünn. (Current weekly numbers)	The Burgomaster
Prague. Bulletins hebdomadaires et trimestriels de la ville et communes-faubourgs. (Current numbers)	The Municipal Statistical Bureau
Belgium—	
Chemins de Fer, Postes, Télégraphes, Téléphones et Marine. Compte-rendu des opérations pendant 1894. Maps, fol.	Mr. J. S. Keltie
Commerce spécial avec les pays étrangers en ce qui concerne les principales marchandises. Bulletin mensuel du. (Current numbers.) 4to.	The Bureau of General Statistics
Mines de Belgique. Annales des, Année 1897. Tome ii, livraison 2. Plates, 8vo.	The Administration of Mines
Travail. Revue du Travail publiée par l'Office du. (Current monthly numbers.) 8vo.	The Belgian Labour Department
Brussels—	
Annuaire Démographique et Tableaux Statistiques des causes de Décès. 35e année, 1896. Diagram	Dr. E. Janssens
Bulletins hebdomadaires et trimestriels de statistique démographique et sanitaire. (Current numbers)	
Hasselt. Verslag over Bestuur en Toestand der Gemeentezaken, 1895-96. 8vo.	The Burgomaster
Bulgaria—	
Mouvement commercial avec les pays étrangers. Mouvement de la navigation par ports. Prix moyens dans les principales villes. (Current monthly numbers.) La. 8vo	The Statistical Bureau
Chile—	
Sinopsis Estadistica y Jeográfica de la Republica en 1895. 8vo. 1896	Mr. J. S. Keltie

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(a) **Foreign Countries**—*Contd.*	
China—	
Customs Gazette. Oct.—Dec., 1896. 4to.	Sir Robert Hart, Bart., G.C.M.G.
Decennial Reports on the Trade, Navigation, Industries, &c., of the Ports open to Foreign Commerce in China and Corea, and on the condition and development of the Treaty Port Provinces, 1882-91. First issue. Maps, &c. 4to.	
Denmark—	
Communications de Statistique. 3e Série. Tome 17. 8vo. 1897	The Statistical Bureau
Nationalökonomisk Tidskrift, 1897. (Current numbers)	The Danish Political Economy Society
Egypt—	
Comité de Conservation des Monuments de l'Art Arabe, Exercice 1895. Procès-Verbaux des Séances, Fasc. 12. Plates. 8vo.	The Committee
Commerce extérieur. Bulletin mensuel du. (Current numbers)	The Director-General of Customs
Dette Publique. Compte-Rendu des Travaux de la Commission de la, pendant 1896. 21e année. 8vo.	The Ministry of Finance
Finances. Compte général de l'administration des Finances pour l'Exercice 1896. Fol.	
Sanitaires, &c. Bulletin hebdomadaire de l'Administration des Services. (Current numbers)	The Health Department
France—	
Agriculture. Bulletin du Ministère de l'. Année 1897. (Current numbers)	The Ministry of Agriculture
Annuaire Statistique de la France. xvie volume. 1895-96. 8vo.	The French Labour Department
Budget Général de l'Exercice 1897. 15 parts. 4to. 1896	Mr. J. S. Keltie
Chemins de Fer Français. Statistique des, au 31 Déc., 1895. Documents principaux. Maps, 4to.	The Ministry of Public Works
Commerce de la France. Documents Statistiques. (Current monthly numbers)	Purchased
Finances, Ministère des. Bulletin de Statistique et de Législation comparée. (Current monthly numbers)	The Ministry of Finance
Travail. Bulletin de l'Office du. (Current monthly numbers.) 8vo.	The French Labour Department
Documents sur la question du Chômage. 4to. 1896.	
Statistique des grèves et des recours à la conciliation et à l'arbitrage survenus pendant 1896. 8vo.	
Colonies—	
Saint Pierre et Miquelon. Annuaires des Iles, pour 1895. 8vo.	Mr. J. S. Keltie
Guadeloupe et Dépendances. Annuaire de la. Année 1895. 8vo.	
Économiste Français. (Current weekly numbers)	The Editor
Journal des Économistes. (Current monthly numbers)	,,
Monde Économique. (Current weekly numbers)	,,

Donations—Contd.

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(a) **Foreign Countries**—*Contd.*	
France—*Contd.*	
Polybiblion. Revue Bibliographique Universelle. Parties Littéraire et Technique. (Current monthly numbers)	The Editor
Questions Diplomatiques et Coloniales. Revue de Politique extérieure, I^e^ année, Nos. 3—5. 1897. 8vo.	The Publisher
Réforme Sociale. (Current numbers)	The Editor
Rentier. Journal Financier Politique. (Current numbers)	,,
Revue d'Économie Politique. (Current monthly numbers)	,,
Revue Géographique internationale. (Current numbers)	,,
École Libre des Sciences Politiques. Annales. (Current numbers)	The Institution
Musée Social. Circulaires. (Current numbers.) 4to.	,,
Société de Statistique de Paris. Journal. (Current monthly numbers)	The Society
Germany—	
Aemtliche Nachrichten des Reichs-Versicherungsamts. No. 3. 4to. 1897	The Imperial Assurance Bureau
Geschäftsbericht des Reichs-Versicherungsamts für das Jahr 1896 ((*a*) Unfallversicherung). 4to.	
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East India Association. Journal. (Current numbers)	The Association
Imperial Institute. Journal. (Current monthly numbers)	The Institute
Institute of Actuaries. Journal. Vol. xxxiii, part 3. April, 1897	The Institute
Institute of Bankers. Journal. (Current numbers)	,,
Institute of Chemistry. Register of Fellows, Associates, and Students, 1897-98. 8vo.	,,
Institution of Civil Engineers. Minutes of Proceedings. Vol. cxxvii. Plates, 8vo. 1897	,,
London Chamber of Commerce Journal. (Current numbers)	The Chamber of Commerce
Royal Agricultural Society. Journal. Third series. Vol. viii, part 1. 1897	The Society
Royal Asiatic Society. Journal for April, 1897	,,
Royal Geographical Society. Geographical Journal. (Current numbers)	,,
Royal Institution of Great Britain. Proceedings. Vol. xv, No. 90. 1897	The Institution
Royal Society. Proceedings. (Current numbers)	The Society
Royal United Service Institution. Journal. (Current numbers)	The Institution
Sanitary Institute. Journal of the Institute. Vol. xviii. Part 1. April, 1897	The Institute
Society of Arts. Journal. (Current numbers)	The Society
Surveyors' Institution. Transactions. (Current numbers)	The Institution
University College, London. Supplement to the Catalogue (1879) of Books in the General Library and in the South Library, with Appendix. 8vo. 1897	The College

(f) **Periodicals, &c. (British).†**	
Annual Register for 1896	Purchased
Investors' Review. (Current numbers)	,,
Kew Bulletin. (Current numbers)	,,
Palmer's Quarterly Index to the Times	,,
Publisher's Circular. (Current weekly numbers)	,,
Vacher's Parliamentary Companion. (Current numbers)	,,
Year Book of Scientific and Learned Societies, 1897	,,

* Foreign and Colonial Societies will be found under the various Countries or Possessions to which they belong.

† Foreign and Colonial Periodicals will be found under the various Countries or Colonies in which they are issued.

Vol. LX.] [Part III.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY,

SEPTEMBER, 1897.

REPORT *of the* COUNCIL *for the* FINANCIAL YEAR *ended* 31*st December*, 1896, *and for the* SESSIONAL YEAR *ending* 29*th June*, 1897, *presented at the* SIXTY-THIRD ANNUAL GENERAL MEETING *of the* ROYAL STATISTICAL SOCIETY, *held at the Society's Rooms*, 9, *Adelphi Terrace*, *Strand*, *London*, *on the* 29*th of June*, 1897.

THE Council have the honour to submit their Sixty-third Annual Report.

The roll of Fellows on the 31st December last as compared with the average of the previous ten years was as follows—

Particulars.	1896.	Average for the previous Ten Years.
Number of Fellows on 31st December	910	994
Life Members included in the above	181	172
Number lost by death, withdrawal, or default	48	66
New Fellows elected	30	66

Since the 1st January last, 25 new Fellows have been elected, and the Society has lost 24 by death or resignation, so that the number at present on the list is 911.

The Society has to deplore the deaths of the undermentioned Fellows since June last year:—

		Date of Election.
d	Becker, Dr. Karl (*Honorary Fellow*)	1878
	Birch, R. W. Peregrine, M.Inst. C.E.	1884
	Clark, Gordon Wyatt	1849
d	Cunningham, David, C.E.	1875
d	Engel, Dr. Ernst (*Honorary Fellow*)	1854
	Fulford, Henry C.	1895
c d	Garnett, Frederick Brooksbank, C.B.	1881
c d p 2	Hamilton, Rowland	1879
d	Hickson, Sir Joseph, J.P.	1869
	Kelly, Edward R., M.A.	1867

c Indicates those who had served on the Council.
d Indicates those who had been Donors to the Library.
p Indicates those who had contributed Papers, with the number.

		Date of Election—*Contd.*
	Lescher, Herman	1889
c d p 4	Martin, John Biddulph, M.A.	1874
	Martin, Thomas Jaques	1876
c d p 11	Mouat, Dr. Frederic J., F.R.C.S.	1847
	Newbatt, Benjamin, F.I.A.	1862
	Pender, Sir John, G.C.M.G., M.P.	1880
	Richards, Westley	1892
	Tunley, George	1887
	Turnbull, Alexander	1878
d	Walker, General Francis A., LL.D. (*Honorary Fellow*)	1876
	Wood, John Cundell, M.R.C.S., &c.	1895

The above list includes three Honorary Fellows, all distinguished as statisticians and economists; and besides these the Society has during the past year lost many old and valued Fellows, of whom no less than four, viz., the late President Mr. John Biddulph Martin, Dr. F. J. Mouat, Mr. Rowland Hamilton, and Mr. Frederick B. Garnett, had all been intimately connected with the administration of the Society for many years.

Both Mr. Martin and Dr. Mouat had shown the keenest interest in the welfare of the Society from the time that they first became associated with it, and filled successively the most important official positions in its management with the utmost zeal and with great advantage to statistical science. The loss of their services is deeply felt by their colleagues on the Council. Dr. Mouat filled the post of President in 1890-92, and Mr. Martin was elected to the Chair as recently as last June.

The financial condition of the Society is exhibited in the table opposite, in which the particulars are contained for the twenty-five years 1872-96.

The papers read and the members elected at each of the ordinary meetings have been as follows:—

Session 1896-97.

First Ordinary Meeting, Tuesday, 17th November, 1896.

Charles Booth, Esq., Honorary Vice-President, in the Chair.

The following were elected Fellows:—

Harold Cox.
Theodore Llewelyn Davies.
Daniel Fulcomer.
Hermann Gustav Gerlich, Dr. Jur.
Willoughby R. Hawkins.
William Charles Heaton-Armstrong, J.P.
Angus Hooper.
Charles Albert Jenney.
George Washington Olney, LL.B.
Bryan Pontifex.
Frederick Syer Sparrow.
Major Charles Woolmer Williams.

c Indicates those who had served on the Council.
d Indicates those who had been Donors to the Library.
p Indicates those who had contributed Papers, with the number.

Statement of the Condition of the Society in the last Twenty-five Years, 1872-96.

Year.	Number of Fellows on 31st December.	Number of Compounders included therein.	Losses during Year by Deaths, &c.	Gains by Election, &c., during Year.	Ordinary Income.	Ordinary Expenditure.	Income from all Sources.	Income from			Total Expenditure.	Expenditure on		Amount Invested on 31st December.	Year.
								Annual Subscriptions.	Compositions.	Journal Sales.		Journal.	Library.		
					£	£	£	£	£	£	£	£	£	£	
1872....	454	72	17	40	1,112	805	1,112	739	189	141	991[a]	318	5	1,400	1872
'73....	530	75	34	110	1,231	1,026	1,248	832	189	167	1,284[a]	384	17	1,600	'73
'74....	588	84	35	93	1,377	1,479	1,377	918	252	140	1,491	461	40	1,600	'74
'75....	607	87	31	50	1,231	1,723	1,231	928	105	133	1,733	449	18	1,271	'75
'76....	611	90	46	50	1,438	1,320	1,438	1,054	168	159	1,340	524	75	1,271	'76
'77....	683	101	40	112	1,597	1,285	1,597	1,117	252	151	1,476[a]	474	49	1,471	'77
'78....	746	115	45	108	1,732	1,345	1.732	1,197	294	169	1,849[a]	580	32	2,000	'78
'79....	783	119	52	89	1,698	1,427	1,698	1,300	126	176	1,808[a]	671	34	2,400	'79
1880....	808	129	49	74	1,902	1,517	1,902	1,317	273	202	1,806[a]	573	80	2,700	1880
'81....	807	130	45	44	1,649	1,400	1,649	1,306	84	145	1,697[a]	609	37	3,000	'81
'82....	786	135	63	42	1,838	1,580	1,838	1,291	189	227	1,782[a]	553	60	3,200	'82
'83....	860	139	41	115	1,774	1,635	1,778	1,361	126	150	1,943[a]	585	49	3,500	'83
'84....	909	150	57	106	2,055	1,585	3,146[b]	1,447	294	207	3,088[c]	645	38	2,500	'84
'85....	928	148	55	74	1,812	1,832	2,062[d]	1,462	63	188	2,070[c]	625	27	2,500	'85
'86....	943	156	70	85	2,086	1,842	2,086	1,583	231	180	2,106[e]	735	32	2,500	'86
'87....	977	160	59	93	2,029	1,745	2,029	1,621	126	188	2,135[f]	609	87	2,500	'87
'88....	1,059	172	58	140	2,292	1,939	2,292	1,686	334	171	2,003	711	58	2,500	'88
'89....	1,060	175	69	70	2,115	1,904	2,115	1,678	126	229	2,060[g]	623	146	2,500	'89
1890....	1,063	177	65	68	2,097	1,707	2,097	1,764	84	155	2,096[a]	567	68	2,900	1890
'91....	1,019	172	80	36	1,976	1,744	2,076[h]	1,707	42	146	1,957[i]	582	172	2,900	'91
'92....	994	171	70	45	1,980	1,859	1,980	1,634	84	158	1,883[j]	539	94	2,900	'92
'93....	964	176	66	36	1,904	1,921	1,904	1,560	124	128	1,921	578	63	2,900	'93
'94....	933	180	67	36	1,830	1,904	1,830	1,491	105	152	1,904	649	75	2,900	'94
'95....	928	180	59	54	1,793	1,796	1,793	1,468	63	180	1,823[k]	576	56	2,900	'95
'96....	910	181	48	30	1,772	1,787	1,772	1,478	42	168	1,787	571	44	2,900	'96

[a] Includes purchase of Government stock. [b] Includes sale of 1,000*l.* stock. [c] Includes expense of moving to new premises.
[d] Includes Dr. Guy's legacy of 250*l.* [e] Includes cost of Jubilee Volume. [f] Includes cost of Catalogue and Index, and of Charter.
[g] Includes cost of part iv of Index to Journal. [h] Includes Mrs. Lovegrove's legacy of 100*l.*
[i] Includes outlay for Guy Medal and for binding the "Times." [j] Includes outlay for drainage repairs.
[k] Includes cost of Subject-Index to *Journal*.

The Inaugural Address of the President, Mr. John Biddulph Martin, on "Some Developments of Statistical Research and "Methods during Recent Years," was read by Mr. R. H. Hooker.

The Chairman moved the following resolution:—"That the "best thanks of this meeting of the Royal Statistical Society be "given to their President, Mr. John Biddulph Martin, for the "able Inaugural Address delivered at the opening of this session, "and, further, that the meeting desires to take this opportunity "of expressing to Mr. Martin their deep regret at the illness "which has deprived them of his presence in the Chair on this "occasion, and their cordial wishes for his speedy and complete "recovery."

Dr. W. Ogle seconded the resolution, which was carried unanimously.

Second Ordinary Meeting, Tuesday, 15th December, 1896.

John Biddulph Martin, Esq., President, in the Chair.

The following were elected Fellows:—

Francis John Allan, M.D.
George Berney Allen.
Daniel Maclaren Brown, junr.
Percy Wynn Everett.
Benton Fletcher.
William Fleetwood Sheppard, M.A., LL.M.
John Tubb Thomas, L.R.C.P., L.R.C.S. Edin.

The Rev. W. Douglas Morrison read a Paper on "The Inter-"pretation of Criminal Statistics."

In the discussion which followed, the undermentioned took part:—The President, Sir Francis S. Powell, Bart., M.P., Mr. John Glover, J.P., Mr. Noel A. Humphreys, Mr. C. De Broë, Mr. E. W. Brabrook, Mr. A. E. Bateman, C.M.G., Mr. J. Macdonell, LL.D., and Rev. W. D. Morrison in reply.

Third Ordinary Meeting, Tuesday, 19th January, 1897.

Dr. G. B. Longstaff, M.A., F.R.C.P., in the Chair.

The following were elected Fellows:—

S. Hayakawa.
Mrs. Margaret Ethel Macdonald.
Bihari Lal Rai.
James Calvert Spensley.
Daniel Thomas Williams.
Ernest E. Williams.

Mr. T. A. Welton read a Paper on "Local Death-Rates in "England and Wales in the Ten Years 1881-90."

In the discussion which followed, the undermentioned took part:—Mr. Noel A. Humphreys, Mr. E. L. Walford, Mr. A. H.

Bailey, Mr. F. Hendriks, Mr. G. H. Perris, Dr. Shirley Murphy, Dr. G. B. Longstaff (Chairman), and Mr. T. A. Welton in reply.

Fourth Ordinary Meeting, Tuesday, 16th February, 1897.

A. E. Bateman, Esq., C.M.G., Vice-President, in the Chair.

The following was elected a Fellow:—

Reginald Dudfield, M.A., M.B.

It was announced that the Howard Medal for 1896 had been awarded to Dr. James Kerr, M.A., M.D., D.P.H., for his Essay on "School Hygiene, in its Mental, Moral, and Physical Aspects."

In the absence through illness of Mr. Noel A. Humphreys, the Author, a Paper on "English Vaccination and Small-Pox Statistics, "with special reference to the Report of the Royal Commission "and to recent Small-Pox Epidemics," was read by Mr. J. A. Baines, C.S.I., Honorary Secretary.

In the discussion which followed, the undermentioned took part:—Dr. W. J. Collins, Dr. G. B. Longstaff, Maj.-Gen. A. Phelps, Mr. J. Hutchinson, Mr. A. Milnes, Dr. E. Seaton, Mrs. M. E. Lawrie, and Mr. J. A. Baines.

Fifth Ordinary Meeting, Tuesday, 16th March, 1897.

The Right Hon. G. Shaw-Lefevre, Honorary Vice-President, in the Chair.

The following were elected Fellows:—

Albert Bickerton Deane. | Arnold Hepburn.
Walter Frederick Harris. | James Johnston.
Sir Edmund Hope Verney, Bart.

The Howard Medal was presented to Dr. James Kerr, M.A., M.D., for his Essay on "School Hygiene, in its Mental, Moral, "and Physical Aspects."

Mr. F. C. Danvers read a Paper on "Agriculture in Essex "during the past Fifty Years: as exemplified by the Records of "one Farm, with special reference to the Prices of Corn and the "Conditions of Labour."

In the discussion which followed, the undermentioned took part:—Mr. H. Moncreiff Paul, Mr. R. H. Rew, Mr. W. E. Bear, Mr. Clare S. Read, Mr. J. C. Pillman, Mr. W. C. Little, and the Right Hon. G. Shaw-Lefevre (Chairman).

Sixth Ordinary Meeting, Tuesday, 27th April, 1897.

A. E. Bateman, Esq., C.M.G., President, in the Chair.

The President moved the following resolution, which was seconded by Mr. J. Macdonell, LL.D., Vice-President, and carried unanimously:—

"That the Royal Statistical Society desire to place on record "their deep regret at the loss which they have sustained by the "death of Mr. John Biddulph Martin, M.A., their late President, "whose services to the Society have extended uninterruptedly "since 1874, and have included several interesting contributions "to the *Journal*.

"Mr. Martin's close connection with the management of the "Society during nearly the whole period of his membership is "shown by his having been at different times Honorary Secre- "tary, Honorary Foreign Secretary, Trustee, Vice-President, and "eventually President; while his Inaugural Address at the com- "mencement of the present session will remain a valuable statement "of the recent developments and present position of Statistical "Science."

The following were elected Fellows:—

William Bennett.	Goland Burton Dobson.
John Thomas Biggs, J.P.	Albert Ranson.
David Burke.	Henry H. Vernon, M.D., F.R.S. Edin.

Mr. H. W. Wolff read a Paper on "Savings Banks at Home "and Abroad."

In the discussion which followed, the undermentioned took part:—The President, Mr. A. H. Bailey, Mr. N. L. Cohen, Mr. Frank Dethridge, Mr. John Dun, Mr. L. Tatham, Mr. W. F. B. Eyre, Mr. E. W. Brabrook, and Mr. H. W. Wolff in reply.

Seventh Ordinary Meeting, Tuesday, 25th May, 1897.

A. E. Bateman, Esq., C.M.G., President, in the Chair.

The following were elected Fellows:—

Edward Herbert Anning.	C. Williamson Milne.
Godefroi Drew Ingall, F.I.S.	Joseph Herbert Walton.

The following were elected Honorary Fellows of the Society:—

M. Emile Cheysson, Inspector-General of Bridges and Highways for France.
Dr. Adolf Wagner, Professor at the University of Berlin.

Sir Robert Hunter read a Paper on "The Movements for the "Inclosure and Preservation of Open Lands."

In the discussion which followed, the undermentioned took part:—Mr. Basil Holmes, Mr. P. Birkett, Mr. George Howell, and Sir Robert Hunter in reply.

Eighth Ordinary Meeting, Tuesday, 15th June, 1897.

A. E. Bateman, Esq., C.M.G., President, in the Chair.

The following were elected Fellows:—

Frederick Evelyn Cairnes. | Price Howell.
Frederick W. Lawrence, B.A.

Mr. Alfred Milnes, M.A., read a Paper on "Statistics of Small-"Pox and Vaccination, with special reference to Age-Incidence, "Sex-Incidence, and Sanitation."

In the discussion which followed, the undermentioned took part:—Mr. Noel A. Humphreys, Dr. Walter R. Hadwen, Mr. Shirley F. Murphy, M.R.C.S., Mr. G. Udny Yule, Dr. E. J. Edwardes, and Mr. Alfred Milnes in reply.

In consequence of the deeply regretted death of Mr. John B. Martin, the President, a special meeting of the Council was summoned for 2nd April, when, under Rule 15, Mr. A. E. Bateman, C.M.G., was unanimously elected President for the remainder of the Session.

The Council have caused a dutiful and loyal address of congratulation to Her Most Gracious Majesty the Queen on the occasion of the completion of the sixtieth year of her reign to be drawn up and signed by the President, and it has been forwarded to Her Majesty through the usual channel.

A Special Committee was appointed by the Council in November, 1895, to consider the desirability of obtaining a simultaneous universal census throughout the civilised world in the year 1900, and consisted of the following Fellows:—Sir Rawson W. Rawson, K.C.M.G., C.B., Mr. J. A. Baines, C.S.I., Mr. T. H. Elliott, Mr. Noel A. Humphreys, Dr. G. B. Longstaff, Mr. John B. Martin, and Mr. F. G. P. Neison. The Committee had before them the Report drawn up by a Committee appointed at the instance of Dr. Guillaume, Director of the Statistical Bureau of the Federal Government of Switzerland, at the biennial meeting of the Inter-

national Statistical Institute held at Berne in August, 1895 (see *Journal* for December, 1895, p. 635), and in July last year drew up the Report which was adopted by the Council in December, 1896, and is printed in the *Journal* for March, 1897, p. 162. The Committee were unanimously of opinion that the difficulties to be encountered, and the many grave disadvantages to each individual country which would result in breaking the regular series of censuses, would more than outweigh any advantages that might be gained by a synchronous census of the whole world.

The present lease of the Society's premises coming to an end in December, 1897, the Council have been able to secure a renewal, on fairly similar terms, up to March, 1904. The trouble and expense of moving to new quarters, which would put a severe strain upon the resources of the Society in their present condition, will thus be avoided, at all events for some years.

The average attendance of Fellows at the several ordinary meetings of the past session is exactly the same as last year, while the total attendance also remains about the same. The change of hour for the ordinary meetings from 5 to 5.30 o'clock in the afternoon has not, however, been altogether successful, chiefly because the discussions on interesting papers have, in more than one instance, had to be unduly curtailed from want of time. The question of reverting to 5 o'clock, or of fixing some other hour which may appear more suitable, is now being carefully considered by the Council.

Permission to hold the ordinary meetings of the Society in the Lecture Theatre of the Royal United Service Institution has been continued, through the courtesy of the Council of the Institution.

The Council would urge individual Fellows to give their assistance in maintaining a supply of interesting papers, and also in keeping up the numbers of the Society, which again show a slight decrease compared with last year. This last consideration will become serious if the decrease continues, especially as the expenses of the Society, with the needs of its constantly increasing library, are not susceptible of any considerable reduction.

Under the conditions in the regulations laid down for the award of the Guy Medal, the Council have awarded a silver Guy Medal to Mr. Frederick J. Atkinson, of the Indian Department of Finance and Commerce, for his paper on "Silver Prices "in India," which was published in the *Journal* for March. The

paper consists of an exhaustive statistical statement of the fluctuations of prices in India from 1860, by the use of Index Numbers.

The Howard Medal for 1896 (together with 20*l.*) was awarded to Dr. James Kerr, M.A., M.D., D.P.H., Medical Superintendent to the Bradford School Board, for his essay on "School Hygiene, "in its Mental, Moral, and Physical Aspects," which appears in the current number of the *Journal*. No subject was selected for competition last year, but for the Howard Medal which will be awarded in 1898 (with 20*l.* as heretofore) the subject is as follows:—

"The Treatment of Habitual Offenders, with special reference "to their Increase or Decrease in various Countries."

The meeting of the British Association was held last year at Liverpool, Section F being under the presidency of the Right Hon. Leonard Courtney, M.P., whose opening address was given in the *Journal* for December. Papers were also read by Mr. C. S. Loch, B.A., Mr. Edwin Cannan, M.A., Mr. A. W. Flux, M.A., Mr. William Fowler, Fellows of the Society, and by Dr. Clément Juglar (Honorary Fellow).

The cordial thanks of the Council have been tendered on behalf of the Society to the Auditors for their honorary services in auditing the Treasurer's accounts for the past year.

The following list of Fellows proposed as President, Council, and Officers of the Society for the Session 1897-98, is submitted for the consideration of the meeting:—

Council and Officers for 1897-98.

PRESIDENT.

*THE RIGHT HON. LEONARD H. COURTNEY, M.A., M.P.

COUNCIL.

Arthur H. Bailey, F.I.A.
Jervoise A. Baines, C.S.I.
Sir Courtenay Boyle, K.C.B.
*Sir Henry Charles Burdett, K.C.B.
*Nathaniel Louis Cohen.
Major Patrick George Craigie.
*Richard Frederick Crawford.
Frederick C. Danvers.
Geoffrey Drage, M.A., M.P.
*The Right Hon. the Earl of Dudley.
Prof. F. Y. Edgeworth, M.A., D.C.L.
Thomas Henry Elliott, C.B.
John Glover, J.P.
Frederick Hendriks, F.I.A.
Henry Higgs, LL.B.
Noel A. Humphreys.
Frederick Halsey Janson, F.L.S.
Charles S. Loch, B.A.
Geo. B. Longstaff, M.A., M.D., F.R.C.P.
John Macdonell, LL.D.
Richard Biddulph Martin, M.A., M.P.
*Francis G. P. Neison, F.I.A.
William Ogle, M.A., M.D., F.R.C.P.
Thomas J. Pittar.
Sir Francis S. Powell, Bart., M.P.
Richard Price-Williams, M.Inst.C.E.
Lesley Charles Probyn.
*R. Henry Rew.
H. Llewellyn Smith, M.A., B.Sc.
The Right Hon. the Earl of Verulam.

Those marked * are new Members of Council.

TREASURER.

Richard Biddulph Martin, M.A., M.P.

HONORARY SECRETARIES.

Major P. G. Craigie. | Noel A. Humphreys.
Jervoise A. Baines, C.S.I.

HONORARY FOREIGN SECRETARY.

Major P. G. Craigie.

The abstract of receipts and payments, and the balance sheet of assets and liabilities on 31st December, 1896, are subjoined, together with the report of the Auditors on the accounts for the year 1896:—

(I.)—Abstract *of* Receipts *and* Payments *for the* Year *ending* 31*st* December, 1896.

RECEIPTS.	£	s.	d.	PAYMENTS.	£	s.	d.
Balance in Bank, 31st December, 1895 ...	£352 9 2			Rent less Tax £319 11 8			
				Less sublet ..... 75 – –			
					244	11	8
Balance of Petty Cash.	32 13 –			Rates and Taxes	58	3	3
,, Postage Account	3 5 8			Fire, Lights, and Water	46	1	7
	388	7	10	Repairs, Furniture, &c.....	9	2	3
Dividends on 2,900*l.* Consols.....	77	2	–	Salaries, Wages, and Pension ...	500	–	–
Annual Subscriptions:—				Journal, Printing..... £518 15 5			
48 Arrears..... £100 16 –				,, Shorthand Reporters	33 7 8		
645 for the year 1896	1,354 10 –			,, Literary Services	18 14 9		
11 in Advance	23 2 –				570	17	10
704	1,478	8	–	Ordinary Meeting Expenses	50	18	8
				Advertising	39	14	6
				Postage and delivery of Journals..	67	16	2
				Stationery and Sundry Printing...	75	5	11
				Library.....	43	11	–
				Howard Medal	20	17	6
				Incidental Expenses	59	11	10
					1,786	12	2
2 Compositions.....	42	–	–	Balance per Bank Book	£335 11 9		
Journal Sales	168	–	8	Balance of Petty Cash	35 12 7		
Advertisements in Journal	6	6	–	,, Postage Account.....	2 8 –		
					373	12	4
Total.....	£2,160	4	6	Total	£2,160	4	6

(Signed) "J. O. Chadwick, F.C.A.,
"Sam. Dyer Nix, F.C.A.,
"Chas. Atkinson,
} *Auditors.*"

"10*th February*, 1897.

(II.)—Balance Sheet *of* Assets *and* Liabilities *on* 31*st* December, 1896.

LIABILITIES.	£ s. d.	£ s. d.
Harrison and Sons, for Journal	97 12 7	
Miscellaneous, as per list	58 11 4	
		156 3 11
11 Subscriptions received in advance		23 2 –
		179 5 11
Balance in favour of the Society*		6,609 4 10
		£6,788 10 9

ASSETS.	£ s. d.	£ s. d.
Cash Balances		373 12 4
2,900*l.* New 2¾ per cent. Consols cost		2,760 14 5
Property: (Estimated Value of)—		
Books in Library	£1,500	
Journals, &c., in Stock	1,500	
Pictures, Furniture, and Fixtures	500	
		3,500 – –
Lease of Premises (cost)	500	
Less amount written off for time expired	455	
		45 – –
Arrears of Subscriptions recoverable		80 – –
Sundry debtors		29 4 –
		£6,788 10 9

(Signed) "J. O. Chadwick, F.C.A.,
"Sam. Dyer Nix, F.C.A., } *Auditors.*"
"10*th February*, 1897. "Chas. Atkinson,

* This balance is exclusive of the present value of the absolute Reversionary Interest bequeathed to the Society by the late Dr. Guy.

(III.)—Building Fund (Established 10*th July*, 1873), Balance Sheet, *on* 31*st* December, 1896.

LIABILITIES.	£ s. d.	£ s. d.
Amount of Fund invested from last Account	267 9 8	
Balance from 1895 to be invested	6 4 5	
		273 14 1
Dividends received during 1896		8 10 4
		£282 4 5

ASSETS.	£ s. d.	£ s. d.
	Stock.	Cost.
Invested as per last Account in Metropolitan Consolidated 3½ per Cent. Stock, in the name of the Treasurer, Richard B. Martin, Esq., M.P.	251 15 3	267 9 8
Balance from 1895 to be invested	6 4 5	
Balance from 1896 to be invested	8 10 4	
		14 14 9
		£282 4 5

(Signed) "J. O. Chadwick, F.C.A.,
"Sam. Dyer Nix, F.C.A., } *Auditors.*"
"10*th February*, 1897. "Chas. Atkinson,

"REPORT OF THE AUDITORS FOR 1896.

"*The Auditors appointed to examine the Treasurer's Accounts of the Society for the Year* 1896,

"REPORT:—

"*That they have compared the Entries in the Books with the several Vouchers for the same, from the 1st January to the 31st December*, 1896, *and find them correct, showing the Receipts (including a Balance of* 388*l.* 7*s.* 10*d.*, *from* 1895) *to have been* 2,160*l.* 4*s.* 6*d.*, *and the Payments* 1,786*l.* 12*s.* 2*d.*, *leaving a Balance in favour of the Society of* 373*l.* 12*s.* 4*d.* *at the 31st December*, 1896.

"*They have also had laid before them an Estimate of the Assets and Liabilities of the Society at the same date, the former amounting to* 6,788*l.* 10*s.* 9*d.*, *and the latter to* 179*l.* 5*s.* 11*d.*, *leaving a Balance in favour of the Society of* 6,609*l.* 4*s.* 10*d.*, *exclusive of the present value of the absolute Reversionary Interest bequeathed to the Society by the late Dr. Guy.*

"*The amount standing to the credit of the Building Fund at the end of the year* 1896, *was* 282*l.* 4*s.* 5*d.*, *of which* 267*l.* 9*s.* 8*d.* *was invested in* 251*l.* 15*s.* 3*d.* *Metropolitan Three and a Half per Cent. Stock, in the name of the Treasurer, Richard B. Martin, Esq., M.P., thus leaving a balance of* 14*l.* 14*s.* 9*d.* *to be invested.*

"*They have verified the Investments of the Society's General Funds and Building Fund, and also the Banker's Balance, all of which were found correct.*

"*They further find that at the end of the year* 1895 *the number of Fellows on the list was* 928, *which number was diminished in the course of the year to the extent of* 48, *by Death, Resignation, or Default, and that* 30 *new Fellows were elected, leaving on the list on the* 31*st December*, 1896, 910 *Fellows of the Society.*

(Signed) "J. O. CHADWICK, F.C.A.,
"SAM. DYER NIX, F.C.A.,
"CHAS. ATKINSON. } *Auditors.*"

10*th February*, 1897.

Proceedings *of the* Sixty-Third Annual General Meeting.

A. E. Bateman, Esq., C.M.G., President, *in the Chair.*

The circular convening the meeting was read.

The minutes of the last ordinary meeting having been read and confirmed,

The President said that it was usual to take the Report of the Council, which was now in the hands of Fellows, as read, and he had only a few comments to make on it. During the year ended 31st December, 1896, they had lost 48 Fellows, and 30 new ones had been elected, so that there was a slight decline in numbers since last year. Among their losses they had to deplore the death of several Fellows who had taken an active part in the Society, and especially the great loss of their late President, Mr. Martin. After referring to the presentation of the address of congratulation to Her Most Gracious Majesty the Queen, and the renewal of the lease of the Society's present premises, he drew special attention to the paragraph with regard to the hour of meeting, and said the Council would be glad to have any opinion on this point from the Fellows generally, as they were anxious to consult the convenience of the bulk of the Fellows by going back either to 5 o'clock or to the old evening meetings, if that were considered better for the Society as a whole. Of course there were objections to both times, and it had even been proposed that they might have some meetings at 5 and some at 8, but he should be glad to hear any observations on either of these suggestions. He then drew special attention to the paragraph urging individual Members to assist in maintaining the supply of interesting papers, and in obtaining fresh Fellows. This was a subject which required serious consideration; there was much more competition now than there was sixty-three years ago when the Society was first formed. There were many other societies which discussed topics statistically, besides all the magazines, and not only was there a greater difficulty in getting papers, but also in getting Fellows, because many people who were interested in one particular subject were inclined to rely upon being invited to the Statistical Society if that subject came up for discussion, and would rather spend the two guineas in some other way. On the whole the papers they had had during the past session had kept up a very fair average of merit, and considering the difficulties he had spoken of, he thought they had been going on well, but he hoped that the Society might do better in the next year or two. They were indeed fortunate in having secured as President for next session such a distinguished economist and statistician as Mr. Leonard Courtney.

In conclusion he moved:—

"That the Report of the Council, the Abstract of Receipts and Payments, the Balance Sheet of Assets and Liabilities, and the Report of the Auditors for 1896 be adopted, entered on the Minutes, and printed in the *Journal*."

Mr. N. L. Cohen had much pleasure in seconding the motion. They all felt that the figures set out tended to show that the administrative efficiency of the Society had certainly been continued, though no great progress had been made in the number of members. Still the receipts from the sale of the *Journal* were satisfactory, being higher than any other year, except the one immediately preceding. He was glad to hear that it was proposed to take into consideration the hour of meeting, and thought it would be well to make a tentative effort in the direction of seeing whether any change was desirable, as the question could only be solved satisfactorily by actual experience. The present hour had not been long adopted, and he thought it would be well to try, say, once a quarter, whether a meeting in the evening would be more convenient before adopting any permanent change. The question of increasing the numbers of Fellows did not depend so much on the administration as on the general body of Fellows, and on their appreciation of the work of the Society and their interest in it.

Mr. H. Moncreiff Paul said that there was of course a difference of opinion as to the best hour for meeting, but he thought there was a good deal in what Mr. Cohen had said, and entirely approved his suggestion that they should revert at least once a quarter to the old plan of meeting at 8 o'clock. That hour was probably the most convenient for those Fellows who lived in town.

The resolution for the adoption of the Report was then put and carried unanimously.

Mr. H. Moncreiff Paul and Mr. D. F. Park having been appointed scrutineers of the ballot for the election of the Council and Officers for the ensuing session,

The President announced, while the ballot was being taken, that, under Rule 9, the names of fourteen Fellows had to be removed from the list in default of payment of their subscriptions. Amongst them was one foreigner and five from the Colonies and India, who had presumably moved about and been lost sight of.

The President also announced that the subject for the next competition for the Howard Medal would be "The Treatment of Habitual Offenders, with special reference to their Increase or Decrease in various Countries."

The President said that the Guy Silver Medal had been

awarded to Mr. Frederick J. Atkinson, of the Financial Department, Government of India, for his paper on "Silver Prices in India," published in the *Journal* for March, 1897. He regretted that that gentleman was not present to receive the Medal in person.

It was then announced that the proposed list of Council and Officers for the ensuing session had been unanimously adopted, and thanks were voted to the scrutineers for their services.

Mr. E. W. Brabrook proposed "that a cordial vote of thanks be given to the President, Council, and Officers for their services during the past session, and to the President for presiding on the present occasion." Those present had already substantially agreed to this resolution in adopting the Report of the Council, and he should not have thought it necessary to add a word, if it were not that special thanks were due from the Society to their President for the manner in which he took office on the melancholy occasion of the death of the late Mr. John Biddulph Martin, and for the way in which he had fulfilled the various duties so suddenly thrust upon him at that time. For his services in presiding that afternoon they were likewise grateful.

Mr. R. H. Rew seconded the resolution, which was carried unanimously.

Mr. Bateman in reply said that he was much obliged for the kind way in which the resolution had been proposed, seconded, and carried. Speaking for himself, he could only say that he had been very glad to be of any service to the Society. The vacancy in the Presidentship having occurred in such a sad and sudden way, it was quite impossible to look about at that time to elect a successor; and as the Statistical Society, like the Queen's Government, had to be carried on, it was thought best for one of the Vice-Presidents to take office and carry on the business as well as possible. This he trusted he had been able to do with the assistance he had received from the Secretaries and Officers of the Society. To them more than to himself the thanks of Fellows were due.

English Vaccination *and* Small-Pox Statistics; *with special* Reference *to the* Report *of the* Royal Commission, *and to recent* Small-Pox Epidemics. *By* Noel A. Humphreys.

[Read before the Royal Statistical Society, 16th February, 1897. A. E. Bateman, Esq., C.M.G., Vice-President, in the Chair.]

Few will be disposed to under estimate the importance at the present time of sound information and conclusions on the "effect "of vaccination in reducing the prevalence of, and the mortality "from, small-pox." This was the first of the five questions submitted to the Royal Commission on Vaccination, on the 29th of May, 1889, for inquiry and report. After a laborious inquiry extending over more than seven years, at a cost of more than 13,000*l.*, the Royal Commission issued their final report in August last. This report, which can scarcely fail to serve as the basis of further legislation on the subject of compulsory vaccination, contains an almost exhaustive amount of information on the nature and history both of small-pox and of vaccination. Abundant materials for the formation of sound conclusions on the vexed question of the influence of vaccination on small-pox, whether viewed from a political, medical, or purely public health point of view, may be found in the various volumes of report and evidence issued by this Commission during the past seven years.

The determination of the real influence and effect of vaccination as a protection against small-pox appears to be to so large an extent a statistical problem, that I have felt justified in asking the Royal Statistical Society to devote an evening to the consideration and discussion of this paper, which deals mainly with the statistical evidence given before the Royal Commission, with special reference to the statistics of recent small-pox epidemics. My object has been to present these statistics in such a manner as to facilitate the formation of sound conclusions on the subject, and with as much impartiality as the nature of the facts and figures permits.

If vaccination confers the protection against small-pox that has been attributed to it, the steady increase in the adoption of the practice which has been maintained throughout the greater part of this century should have resulted in a marked diminution of the mortality from small-pox during that period. It is therefore in the first place necessary to supply an answer to the question which at the outset of the inquiry presented itself to the Commissioners: Does the history of small-pox mortality since vaccination was introduced afford warrant for a belief in its protective effect?

The rate of mortality from small-pox prior to the discovery of vaccination is somewhat beside the present inquiry, and it was not until 1837, when the civil registration of deaths commenced, that any really useful or trustworthy statistics of small-pox mortality in England were available.

Vaccination Legislation.

Before, however, considering the Registrar-General's statistics of small-pox mortality since 1837, it is desirable to note the various legislative enactments dealing with vaccination. Although the House of Commons made grants to Jenner in 1802 and in 1806, and annual grants to the National Vaccine Establishment, which was founded by royal warrant in 1807, the first Act dealing with vaccination was "An Act to extend the Practice of Vaccina-"tion," which received royal assent on the 23rd of July, 1840. By this Act poor law guardians throughout England and Wales were empowered and directed to contract with their medical officers, or with any legally qualified medical practitioners, for the vaccination of persons resident within each union or parish, payment being authorised for all successful primary vaccinations. This Act moreover declared the inoculation of small-pox illegal, and the use of it was made penal. In the following year this first vaccination Act was amended, and the expense of carrying out the original Act was charged on the poor rates; it was further provided that "the vaccination or surgical or medical assistance "incident to the vaccination of any person resident in any union "or parish, or of any of his family, should not be considered "parochial relief." Under these two Acts vaccination remained voluntary: they only provided the public vaccinator, whose services were available to all who might come to him for the purpose of vaccination.

In 1853, at the suggestion of the Epidemiological Society, which had recently been founded, Lord Lyttleton introduced into the House of Lords "A Bill to extend and make compulsory the "Practice of Vaccination," which was afterwards passed and became law without opposition or division. By the provisions of

this Act each union, or parish if not in union, was divided into vaccination districts, in order to increase the facilities for the vaccination of the poor. Vaccination stations were appointed, at which the public vaccinator would attend, at fixed hours, to vaccinate and to inspect the result of previous vaccinations. This Act provided that the registrar should at the registration of the birth, or within seven days of such registration, send to the parents a scheduled notice that the infant must be vaccinated; and the Act imposed a fine of 20*s.* upon any parent who, after such notice, did not cause the child to be vaccinated, and to be inspected on the eighth day after the vaccination. In order to facilitate proceedings under the compulsory clauses, an Act was passed in 1861 giving permission to guardians and overseers to appoint some person to institute and conduct proceedings for the purpose of enforcing obedience to the Vaccination Acts. This Act, moreover, distinctly enacted that proceedings might be taken at any time during which the parent remained in default. This provision was due to a legal decision that under the compulsory Act of 1853 a defendant, having been once convicted and fined, could not be convicted and fined a second time for the same offence, as failure to take a child to be vaccinated within three months of its birth was held to be a single definite offence. In 1867 an Act consolidating previous Vaccination Acts was passed, and although some not unimportant changes were introduced into this Act, they do not need special notice here, except (1) that for the first time optional provision was specifically made for the appointment of vaccination officers, and for the encouragement of re-vaccination, and (2) that the machinery for securing the registration of vaccinated children, and for dealing with cases of neglected vaccination, was much improved.

No further legislation respecting vaccination occurred until the Vaccination Act of 1871, which came into force on 1st January, 1872. This Act resulted from the report of a select committee appointed to inquire into the working of the Consolidating Act of 1867. The most important modification of the law effected by this Act was that the appointment of vaccination officers to enforce the compulsory provisions of the Act of 1853, which had previously been permissive only, was made obligatory upon poor law guardians. Some other changes were made by this Act, but they are comparatively unimportant for the purposes of this paper. It should be noted, however, that the superintendence, direction, and inspection of vaccination, which was by the earlier Acts vested in the Privy Council, was in 1871 transferred to the Local Government Board, in which it is still vested. Such are the principal statutory enactments

affecting vaccination in England. We have seen that gratuitous vaccination was first provided by the Act of 1840; it was made compulsory in 1853; the permissive power to appoint paid vaccination officers was given to guardians in 1867; and as this permissive power was not put in force in a large number of unions, the appointment of vaccination officers was subsequently made compulsory by the Act of 1871.

Statistics of Vaccination.

With a view to judge correctly of the effect of this legislation upon the mortality from small-pox, it is in the first place important to have evidence of the effect of this legislation on the proportion of infants successfully vaccinated. Unfortunately, although there is no reason to doubt that, at any rate during the first three-quarters of this century, a constantly increasing proportion of children was vaccinated in infancy, no satisfactory records of successful infant

TABLE I.—*Statistics of Primary Vaccination of Infants*, 1872-93, *derived from the Annual Reports of the Local Government Board.*

1	2	3	4	5	6	7
Year.	Births Registered during Year.	Of the Children whose Births were Registered during the Year given in Col. 1, before the 31st January in the Year next but one following there were: Successfully Vaccinated.	Certified as insusceptible of Vaccination; had Small-Pox or Died Unvaccinated.	Vaccination postponed by Medical Certificate.	Remaining.	Percentage of Children not finally accounted for (including cases postponed).
1872	821,856	698,137	81,192	42,527		5·1
'73	826,508	704,666	81,540	4,264	36,038	4·8
'74	854,787	727,065	86,341	5,677	35,704	4·8
'75	850,354	722,466	87,549	5,914	34,425	4·7
'76	887,694	763,277	85,885	5,528	33,004	4·3
'77	887,947	766,824	80,541	6,681	33,901	4·5
'78	891,743	760,982	88,820	6,475	35,466	4·7
'79	880,222	756,835	79,246	6,670	37,471	5·0
'80	881,652	750,203	88,266	5,930	37,253	4·9
'81	883,744	765,162	78,569	6,302	33,711	4·5
'82	889,082	763,525	82,536	7,598	35,423	4·8
'83	890,780	762,080	83,060	8,110	37,440	5·1
'84	906,581	764,975	91,578	8,693	41,335	5·5
'85	894,263	757,714	85,006	9,323	42,220	5·8
'86	903,846	754,059	92,072	10,187	47,528	6·4
'87	886,198	733,980	89,410	10,402	52,406	7·1
'88	879,813	719,103	85,187	12,282	62,701	8·5
'89 ...	885,909	707,161	90,755	13,366	74,627	9·9
'90	875,188	682,560	93,442	13,615	85,571	11·3
'91	914,079	693,117	98,166	13,823	108,973	13·4
'92	890,695	663,657	94,499	13,278	119,261	14·9
'93	914,557	661,513	105,875	13,845	133,324	16·1

vaccinations in England and Wales exist prior to 1872. Such

statistics, issued by the Local Government Board, would appear to have been first made possible by the improved registration of vaccinations provided for by the Act of 1871. The annual percentage of children born and not finally accounted for as to vaccination, including cases of postponement, was almost stationary during the twelve years 1872-83, and only ranged between 5·1 in 1872 and 1883, and 4·3 in 1876. After 1883 the percentage unaccounted for rose steadily; at first slowly to 7·1 in 1887, and afterwards more rapidly until it reached 11·3 in 1890, 13·4 in 1891, 14·9 in 1892, and 16·1 in 1893. It may here be noted that the proportion of cases of children in Scotland whose vaccination was not finally accounted for, has since 1872 been constantly and considerably lower than in England, and has shown but a very slight increase in recent years—affording ground for the conclusion that the opposition to vaccination, which has caused so large a decline in the proportion of vaccinations in England, does not exist, or has been comparatively inoperative in Scotland.

Official Statistics of Small-Pox Mortality in England.

Let us now examine the English official statistics of small-pox mortality, commencing with 1838, the first complete year of civil registration. Unfortunately the causes of death in England and Wales in the four years 1843-46 have never been classified, which makes it necessary to omit all reference to those years. During

TABLE II.—*Annual Rate of Mortality per Million Living from Small-Pox in England and Wales*, 1838-95.

[Dr. Ogle's table, "First Report," p. 114 carried on to 1895.]

Year.	Deaths.	Year.	Deaths.	Year.	Deaths.	Year.	Deaths.
1838.....	1,064	1852	401	1867	116	1881	124
'39.....	589	'53	171	'68	93	'82	54
		'54	151	'69	70	'83	39
1840.....	661	'55	134			'84	87
'41.....	400	'56	119	1870	116	'85	107
'42.....	168	'57	204	'71	1,015	'86	13
'43.....	?	'58 ...	332	'72	824	'87	21
'44.....	?	'59	195	'73	101	'88	41
'45.....	?			'74	91	'89	4
'46.....	?	1860 ...	138	'75	40		
'47.....	246	'61	66	'76	103	1890	3
'48.....	397	'62	80	'77	178	'91	5
'49.....	264	'63	289	'78	79	'92	19
		'64	367	'79	25	'93	53
1850.....	262	'65	303			'94	31
'51.....	389	'66	141	1880	29	'95	10

Note.—The deaths in this table include those referred to chicken-pox. The facts are not available for the four years 1843-46.

the twelve years 1838-42, and 1847-53, for which official records exist, prior to vaccination being made compulsory, the annual death-rate from small-pox averaged 408 per million, and ranged between 1,064 in 1838, and 168 in 1842. It may be stated that there is good ground (based upon the statistics for London) for believing that the mean small-pox death-rate in the four years 1843-46, for which no tabulated records exist, somewhat exceeded the mean rate in the twelve years 1838-53, for which the Registrar-General has published the results. Compulsory vaccination came into operation in 1854, and although no effectual means of enforcing the obligation existed until after the Act of 1871 took effect, there is conclusive evidence that a marked increase of primary vaccination commenced in 1854. During the 42 years of compulsory vaccination 1854-95, the annual death-rate from small-pox averaged 126 per million, although this period included the remarkable epidemic in 1871-72; indeed, during the twenty years, 1876-95 the mean annual rate has been only 42 per million. The range of mortality during this period of forty-two years was from 1,012 and 821 per million in 1871 and 1872, to 0·8 and 0·6 per million in 1889 and 1890. Thus, judged by the whole available statistics of the Registrar-General, the mean mortality from small-pox declined from 408 per million in the twelve years prior to compulsory vaccination, to 126 per million in the forty-two years since vaccination was made compulsory, notwithstanding the epidemic of 1871-72; showing an average decline of more than two-thirds, or 69 per cent.

Dr. William Ogle, in his valuable evidence before the Royal Commission, subdivided the period of compulsory vaccination into two:—(1) "Vaccination obligatory but not efficiently enforced, "1854-71;" and (2) "Vaccination obligatory, but more efficiently "enforced by vaccination officers, 1872-87." Those who impartially study the evidence given before the Commission, and the statistics of the subject, can scarcely avoid the conclusion that the passing of the Act of 1871 marks a decided epoch in the inter-relation of small-pox and vaccination, not only on the ground of the compulsory appointment of vaccination officers, but also because of the marked improvement in the machinery for securing the effective action of these officers, which provided the means for a satisfactory registration of successful vaccinations, and of cases unaccounted for. Dr. Ogle's subdivision drew the line after the year 1871, because the Act of that year did not take effect till 1872, and thus included this year of heaviest small-pox mortality in the period of inefficiently enforced obligation, 1854-71. Dr. Ogle with his evidence gave a table showing that in these eighteen years 1854-71, the mean annual mortality from small-pox was

TABLE III.—*Mean Annual Rate of Mortality from Small-Pox at all Ages and at Six Age-Periods in Three Groups of Years, selected with reference to Optional and Obligatory Vaccination. The figures in this Table include the deaths referred to Chicken-Pox.*

["First Report," p. 114.]

1 Period.	2 All Ages.	3 0—5.	4 5—10.	5 10—15.	6 15—25.	7 25—45.	8 45 and upwards.
(1.) Vaccination optional, 1847-53*	305	1,617	337	94	109	66	22
(2.) Vaccination obligatory, but not efficiently enforced, 1854-71	223	817	243	88	163	131	52
(3.) Vaccination obligatory, but more efficiently enforced by vaccination officers, 1872-87	114	242	120	69	122	107	47

* In this table the period of optional vaccination begins with 1847, not with 1838, because the deaths were not abstracted in combination with ages until 1847.

223 per million, whereas under more efficiently enforced compulsion the mean rate fell in the sixteen years 1872-87 to 114 per million. Those Commissioners in sympathy with anti-vaccinators naturally took exception to Dr. Ogle's subdivision, and the witness was subjected to very severe cross-examination with a view to show that he had undervalued the effect of the Act of 1867, by which guardians were empowered, but not compelled, to appoint vaccination officers. The real object was apparently to throw the year 1871, with its remarkable and fatal small-pox epidemic, into Dr. Ogle's later period of enforced compulsion, and thus to lessen the reduction of small-pox mortality attributed to increased vaccination. Although there appears to be no valid reason for doubting that Dr. Ogle's subdivision was fully justified by the facts of the case, it is unnecessary to insist upon it here, as the two simple periods of voluntary vaccination and compulsory vaccination give a sufficiently striking contrast, namely, mean annual rates of 408 and 126 per million respectively, although the compulsory period by this arrangement includes the epidemic of 1871-72.

Mortality from Small-Pox at different Age-Periods.

We must now consider the varying rates of small-pox mortality at different age-periods in successive years. It should in the first place be stated that prior to 1848 the ages and causes of death were not classified by the Registrar-General in combination. The

Commissioners' Report gives a table, which is here reproduced, showing the mean annual mortality per million from small-pox at six age-periods, during the seven years 1848-54, and the four succeeding decennia ending in 1894.

TABLE IV.—*Mean Annual Death-Rate from Small-Pox per Million Living at Six Age-Periods.*

["Final Report," p. 48.]

Years.	Mean Annual Rate per Million Living.					
	Under 5.	5—10.	10—15.	15—25.	25—45.	45 and upwards.
1848-54*	1,514	323	91	110	69	24
'55-64....	789	210	69	119	88	36
'65-74....	783	333	142	267	221	88
'75-84....	128	63	46	82	77	34
'85-94....	50	15	11	24	32	19

* The figures for this period include the deaths attributed to chicken-pox as well as those from small-pox.

The main feature of this table is the marked decline of mortality under 5 years of age, namely, from 1,514 per million in 1848-54 to 50 in 1885-94. Under this arrangement, which is an entirely arbitrary one, the first year of compulsory vaccination is included in the first or seven-year period, but the marked decline under 5 years of age in the next ten years (nearly equal to 50 per cent.), is very striking, taken in conjunction with the actually increased rate at ages over 15 years. In the next ten years, 1865-74, the rate was governed by the epidemic of 1871-72, and showed a marked increase, compared with that in the preceding decennium, at each age-period above 5 years, but under 5 years there was a slight decline, notwithstanding the effect of the epidemic. This is the more remarkable and suggestive when we bear in mind the legislation of 1867 and 1871, which was passed with a view to increase the amount of infant vaccination. In the next ten years, 1875-84, during which the Acts of 1867 and 1871 were in full operation, the rates under 5, and from 5 to 10, fell from 783 and 333 to 128 and 63; while in the last decennium, 1885-94, the rates at these periods further fell to 50 and 15 respectively. Above 10 years of age small-pox rates showed, as has been pointed out, a very largely increased death-rate during the decennium 1865-74, owing to fatal effect of the epidemic in 1871-72 upon the adolescent and upon adults; in this period the rate per million rose to 142 in the 10—15 age period, 267 at the ages 15—25, 221 at 25—45, and 88 among persons aged upwards of 45 years. At each age-

period the rate successively fell in a marked manner in each of the two following decennia, and in 1885-94 the mean rates were only 11, 24, 32, and 19 respectively, being in each case far below the rates in the first period of seven years 1848-54, although the fall did not approach that recorded under 5, and from 5 to 10, which was apparently due to the influence of increased infant vaccination. Comparing the rates under 5 and from 5 to 10 in 1885-94 with those in 1848-54, given in the table, they show a decline to $\frac{1}{30}$ and $\frac{1}{22}$ of the rates that prevailed forty years before, when vaccination was optional.

The marked fatality of small-pox in 1871-72 among persons above the age of childhood, judged by recent statistics, was apparently the result of the exhaustion of the protective influence of infantile vaccination, and of the neglect of re-vaccination. Unfortunately no satisfactory evidence exists which would justify even an estimate of the proportion of the population above the age of childhood that has been re-vaccinated, although it is safe to assume that since the epidemic of 1871-72 the number and proportion of the re-vaccinated have very considerably increased.

The Age-Incidence of Deaths from Small-Pox.

Time and space forbid any discussion of such statistics as exist showing the age-incidence of fatal small-pox in pre-registration periods. It may be stated, however, that there is good ground for believing that formerly small-pox was, to a far greater extent than is now the case, mainly a disease of childhood. For instance, from evidence handed in to the Commission by Sir John Simon, formerly medical officer to the Local Government Board, it appears from an analysis of nearly 7,000 fatal cases of small-pox recorded in Geneva between 1580 and 1760, that more than 96 per cent. occurred among children aged under 10 years, including 81 per cent. under 5 years of age. Dr. McVail, in his valuable analysis of Kilmarnock small-pox statistics in 1728-64, pointed out that the death-rate under 5 years of age was thirty-five times greater than it now is, and that the mean age at death from small-pox was only $2\frac{1}{2}$ years in the last century, whereas it now exceeds 20 years.[1] Bearing on this change of age-incidence and its cause, much evidence was given before the Commission with a view to elucidate the relative protection conferred respectively by an attack of small-pox and by vaccination. To this point it will be necessary to refer. It will suffice here to discuss the change in the age-incidence of small-pox as exhibited by English official statistics since 1848, when ages and causes of deaths were first published by

[1] The mean age at death of the 12,280 fatal cases of small-pox in England and Wales during the ten years 1881-90, was 22·3 years.

the Registrar-General in combination. A table in the Appendix, reprinted from the Commissioners' final report (with the addition of the facts for the year 1895), gives the proportion of 1,000 deaths from small-pox occurring in each year from 1848 to 1895 at each of seven groups of ages. From this table it appears that of 1,000 deaths from small-pox in 1851-60, 239 occurred under 1 year of age, and in 1881-90 only 119; between 1 and 5 years the proportion declined from 363 in 1851-60, to 93 in 1881-90. Thus in the first year of life, during only a portion of which are many infants protected by vaccination, the proportional number of fatal cases of small-pox declined 50 per cent. between 1851-60 and 1881-90, whereas in the period 1—5 years the decline was nearly 75 per cent. Calculated in the same manner, the decrease in the proportion of small-pox deaths occurring between the ages of 5 and 10 years was from 134 in 1851-60 to 64 in 1881-90, and was equal to 52 per cent. Above the age of 10 years the proportion of fatal small-pox cases was higher in 1881-90 than in 1851-60. Thus of 1,000 deaths in 1851-60, 35 occurred between 10 and 15, 103 between 15 and 25, 99 between 25 and 45, and 28 among persons aged 45 and upwards; whereas these proportions had increased in 1881-90 to 52, 222, 326, and 124 respectively. To summarise these figures, of 1,000 small-pox deaths in 1851-60, 735 were of children under 10 years of age, and 265 of persons aged upwards of 10 years; while thirty years later, in 1881-90, when vaccination had been made compulsory, and the compulsion enforced by the Acts of 1867 and 1871, the proportions were more than reversed, for only 277 were of children under 10 years of age, and 723 were of persons aged upwards of 10 years.

The following table, reproduced from the final report of the Commissioners, throws additional light upon this most important change of the age-incidence of small-pox :—

TABLE V.—*Proportion of Deaths from Small-Pox, at each of Six Age-Periods, to* 1,000 *Deaths from Small-Pox at all Ages.*

["Final Report," p. 47.]

	Under 5.	5—10.	10—15.	15—25.	25—45.	45 and Upwards.
1848–54	677	130	33	75	67	18
'55–59	559	144	37	117	112	31
'60–64	550	108	42	123	133	44
'65–69	545	103	33	126	145	48
'70–74	312	140	58	200	224	66
'75–79	241	113	72	218	266	90
'80–84	235	98	68	216	286	97
'85–89	193	54	51	229	344	129
'90–94	283	50	26	131	338	172

This table shows that of 1,000 deaths from small-pox, 677 occurred among children aged under 5 years of age in 1848-54, while the proportion in this age-period steadily declined in subsequent groups of five years to 193 in 1885-89, and rose again to 283 in 1890-94, under the influence of the decrease of infant vaccination, due in great measure to the delay in the issue of the Report of the Commission. On the other hand the proportional numbers of small-pox deaths among persons aged upwards of 15 years steadily rose from 160 per 1,000 in 1848-54 to 702 in 1885-89, and fell again to 641 in 1890-94. To what can this complete *bouleversement* of age-incidence be attributed if not to the undoubted increase in the proportion and efficiency of infant vaccination during the thirty years between the two periods we have compared? Much ingenious sophistry was brought to bear upon this point by a few of the Commissioners in cross-examining some of the witnesses, notably Dr. Ogle and Dr. Thorne Thorne, who prominently brought out this fact in their evidence, and also by some of the anti-vaccination witnesses in their evidence. The facts, however, remain unchallenged, and inexplicable on any other suggested hypothesis than that the change of age-incidence is due to increased infant vaccination. It is, moreover, very noteworthy that in the minority report of Dr. Collins and Mr. Picton, no real explanation of this change of age-incidence is attempted, although attention is called to the fact that in the nine years 1872-80, under the influence of compulsory vaccination, "at every age over 10 years the chance of dying of small-pox "was greater" than it had been in the six years 1848-53, when vaccination was voluntary. It would be interesting to know why Dr. Collins and Mr. Picton confined their comparison to the nine years ending with 1880, and to the ages above 10 years. It is, at any rate, worth noting that if they had enlarged the period to a more recent date, still more if they had compared 1848-53 with say 1888-93, the result of the comparison would have been very different.

Before leaving this branch of the subject, namely, the evidence of the effect of infant vaccination upon child mortality from small-pox, it is necessary to refer to the important statistics given in the Commissioners' Report relating to the age-incidence of the fatal cases of small pox recorded at each of the six epidemics that occurred at Sheffield, Warrington, London, Dewsbury, Leicester, and Gloucester between 1887 and the present time. These statistics are here tabulated:—

TABLE VI.—*Child Mortality from Small-Pox in relation to the Neglect of Vaccination in Six Towns which have recently suffered from Small-Pox Epidemics.*

["Final Report," pp. 50, 51, and 176.]

1 Towns.	2 Date of Epidemic.	3 Total of Small-Pox Deaths.	4 Percentage of Deaths under 10 to Total Deaths from Small-Pox.	5 Mean Percentage of Births "unaccounted for" as to Vaccination.
Warrington	1892–93	62	22·5	4·8
Sheffield	'87–88	589	26·9	4·5
London	'92–93	182	36·8	9·9
Dewsbury	'91–92	110	51·8	32·3
Gloucester	'95–96	434	64·5	67·6
Leicester	'92–93	21	71·4*	68·1

* Excluding the deaths of 3 patients in a scarlet fever ward in close proximity to the small-pox hospital, this proportion would be reduced to 66·6 per cent.

The figures in this table show that in the ten years preceding the epidemic in Warrington, only 5 per cent. of the children born were unaccounted for as regards successful vaccination; in London the mean proportion of children not accounted for was 10 per cent.; in Dewsbury this proportion of unvaccinated children was 32 per cent., and both in Gloucester and Leicester it was so high as 68 per cent. If, as statistics previously dealt with suggest, the proportion of deaths from small-pox among children depends upon the proportion that has been vaccinated, the age-incidence during these six epidemics should show wide variations. This expectation is abundantly fulfilled. In the well vaccinated towns of Warrington and Sheffield only 23 and 26 per cent. respectively of the deaths occurred among children under 10 years of age; but this proportion was 37 per cent. in London, 52 in Dewsbury, 65 in Gloucester, and 71 in Leicester. These figures corroborate in a remarkable manner the evidence afforded by other statistics, and seem to forbid disbelief in the assertion that small-pox mortality, at any rate among children, is directly governed by the proportion of successful vaccinations. It is true that the intensity of the mortality from small-pox also varied very widely in these six epidemics, and it is noteworthy that Dr. Collins and Mr. Picton endeavour to discredit vaccination by pointing out that in Leicester and Dewsbury, in which towns vaccination had been so persistently neglected, the rate of mortality from the disease was much lower than in Sheffield and Warrington, in which vaccination had been well carried out. Is the inference suggested that the mildness of the type of the disease in Dewsbury and Leicester was due to the neglect of vaccination? It is still more noteworthy that

Dr. Collins, when dealing with the statistics of these epidemics, makes no reference to, much less attempts to explain, the remarkable evidence they afford of the relation between infant vaccination and child mortality from small-pox.

What is the true lesson to be learned from this changed incidence of small-pox mortality? If we accept infant vaccination as the explanation of the decreased mortality of small-pox in childhood, and no other reasonable and tenable explanation was suggested by any of the witnesses before the Commission, we are bound also to accept the same explanation of the increased fatality of the disease among adolescents and adults. Small-pox has long since ceased to be mainly a disease of childhood, and notwithstanding the marked decline of the aggregate mortality from this disease, there has been until quite recently no actual decline in its rate of mortality among adults. Much speculation, and some evidence on this point was submitted to the Commission, and may be found in their reports. The only conclusion dictated by common sense, and admitted by most of the best informed witnesses, is that infant vaccination does not afford a protection from small-pox equivalent to that conferred by an attack of small-pox. The opinion has been expressed, by those who have carefully weighed such evidence on the point as exists, that in pre-vaccination times nearly all children had small-pox during some period of childhood, and were thus protected from attack in after life, just as the majority of children now suffer from measles, scarlet fever, and whooping cough, from which no protecting operation equivalent to vaccination has been discovered.

It is much to be regretted that the medical profession so long hesitated to admit that Jenner was over sanguine and mistaken in declaring that infant vaccination conferred life long protection from an attack of small-pox. The hesitation and delay in making this admission appears to have added much force to the anti-vaccination agitation. It would seem to have been a mistaken policy, which feared that such an admission would weaken the arguments for the continued compulsory practice of vaccination, as accumulated evidence of the protective effect of vaccination during childhood cannot be gainsaid.

As to the relative value of vaccination and of an attack of small-pox as a protection from the disease, this is a speculative problem, on the solution of which statistics do not, and in the nature of the case cannot, afford much assistance. Dr. Ogle, in the forty-third annual report of the Registrar-General, expressed the opinion that "the immunity derived from vaccination is both less perfect "and less permanent than that conferred by small-pox itself." Dr. Gayton, in his evidence before the Commission, after quoting

the opinion of Jenner that the protection by vaccination was tantamount to that of an attack of small-pox, said "proofs are "abundant already, and will continue to accumulate, to disprove "these statements." Mr. Sweeting, and in fact all the most experienced authorities, hold the same opinion.[2] It seems possible, however, that the apparent inferiority of vaccination to an attack of small-pox as a protection from that disease may be due to the fact that while the mean age at which vaccination takes place in England is probably under 4 months, the mean age at which children used to be protected by an attack of small-pox was between 2 and 3 years. It might happen that if infant vaccination were postponed until the third year of life, that its protective effect would be both increased and prolonged, and might then equal that conferred by an attack of small-pox. This is, however, mere hypothetical speculation. That the increased proportion of adult mortality from small-pox is due to the fact that the adult population is in some way more susceptible to small-pox infection since the protection of children by infant vaccination, instead of an attack of small-pox, seems to be beyond doubt or controversy.

The Value of Re-vaccination.

The undoubted fact of the increase in the proportion of adult small-pox mortality, concurrently with the decline of child mortality from this disease, might well raise a doubt as to the balance of advantage derived from this changed age-incidence, unless good ground existed for believing in the efficacy of re-vaccination as a means of protecting adults from the disease. Much information was given before the Commission bearing upon the degree of protection conferred by re-vaccination. No one now really questions the fact that the protective influence of infant vaccination diminishes with the lapse of years. The value of re-vaccination is obviously, therefore, a subject of great importance. Unfortunately there are no available statistics showing the amount or proportion of re-vaccination in this country. Except under the influence of panic arising from the epidemic presence of small-pox, the proportion of the adult population that has been re-vaccinated is probably not large. In those towns that have suffered from epidemic small-pox in recent years, careful attempts have been made to obtain information on this point. Dr. Barry, during his inquiry concerning the Sheffield epidemic in 1887-88, ascertained

[2] It should be noted, however, that the investigation of the statistics of the recent epidemics in Sheffield, Dewsbury, Warrington, and Leicester disclosed 35 cases of small-pox occurring among persons who had suffered from a previous attack of this disease, 5 of which proved fatal, showing a case-mortality of 14·2 per cent., which considerably exceeds the average case-mortality among vaccinated persons. These numbers are, however, it must be allowed, small.

and reported that 64,431 re-vaccinated persons were enumerated, and that after careful inquiry into 352 cases of re-vaccinated persons said to have been attacked with small-pox, he only found 27 cases in which small-pox supervened after successful re-vaccination, and only one of these proved fatal, 19 being of an extremely mild character. It is needless to point out that it is as necessary to differentiate between successful and unsuccessful re-vaccination as it is between successful and unsuccessful primary vaccination for it is not held that any protection is conferred by unsuccessful re-vaccination, and one unsuccessful attempt at re-vaccination should not, we are told, be accepted as proof of insusceptibility. Dr. Barry's figures showed an attack rate among re-vaccinated persons of only 0·04 per cent., whereas the attack rate among once vaccinated persons aged above 10 years was 1·9, and among unvaccinated persons 9·4 per cent. In the same inquiry Dr. Barry enumerated 18,292 persons in Sheffield who had had small-pox prior to 1887, of whom 23 had a second attack in 1887-88. These figures showed an attack rate considerably higher than among the re-vaccinated; and the proportional mortality was also higher. Those, however, who have studied the report and evidence issued by the Commissioners, will remember that this part of Dr. Barry's report was subjected to severe criticism, and that some doubt was thrown upon the success of his attempt to enumerate the numbers of the vaccinated, re-vaccinated, and unvaccinated in the Sheffield population. There were in Sheffield at the time of this epidemic 830 troops of all ranks, all of whom should, in accordance with regulations, have been re-vaccinated. Twelve men, however, or 1·4 per cent. of the total strength, were attacked with small-pox, and of these one died; it was, however, proved to the satisfaction of the Commissioners that not one of these 12 soldiers had been *successfully* re-vaccinated, and that in fact although the soldiers mingled freely in the town during the epidemic not a single *successfully* re-vaccinated soldier was attacked by small-pox in Sheffield. Of the Sheffield police who, to the number of 372, were necessarily, in the course of their ordinary duties, brought into close relation with infected persons and things, only ten cases of small-pox occurred. These ten policemen had been vaccinated in infancy, but not one had been re-vaccinated. Not one of the 290 men and boys employed on the permanent staff of the Post Office, who by the regulations must be re-vaccinated before engagement, contracted small-pox, although many of them must have been in contact with infection.

The report contains much similar information relating to the stated numbers of re-vaccinated persons attacked by small-pox during the epidemics in Leicester, Warrington, and Dewsbury,

and to the result of the cases. It does not appear desirable, however, to refer to this class of statistics at greater length, as mere statements as to re-vaccination are at the best more or less unsatisfactory, and are obviously difficult to support by proof.

It seems desirable, therefore, to depend mainly upon the statistics of small-pox hospital nurses and attendants submitted to the Commission, for conclusive evidence of the value of the re-vaccination of adults as a protection from small-pox. Dr. Gayton stated that 366 persons were employed on the staff at Homerton Small-Pox Hospital between 1st February, 1871, and the end of 1877. The whole of these, with one exception, were re-vaccinated on commencing duty, and this accidental exception was the only case of small-pox attack among the 366 hospital attendants. Subsequent to 1877 Dr. Gayton was unable to state the precise number of the staff employed at the Homerton hospital, but was of opinion that the number was equal to that in the previous period. Among these there was again only one case of small-pox, a case in which the nurse had not been re-vaccinated. In the small-pox hospital ships of the Metropolitan Asylums Board, during

TABLE VII.—*Number and Proportion of Attendants, &c., who contracted Small-Pox in the Metropolitan Asylums Small-Pox Hospital Ships in the Twelve Years* 1884-95.

["Final Report," p. 85.]

Year.	Metropolitan Asylums Board's Small-Pox Hospital Ships.		
	Number of Attendants Employed, either Temporarily or otherwise, in the course of the Year.	Of whom there contracted Small-Pox during the Year.	
		Number.	Proportion.
			Per Cnt.
1884	283	4	1·4
'85	240	0	0
'86	110	0	0
'87	55	0	0
'88	46	0	0
'89	53	0	0
'90	64	0	0
'91	64	0	0
'92	138	2	1·4
'93	320	6	1·9
'94	289	0	0
'95	274	0	0

the twelve years 1884-95, the hospital staff, including doctors, nurses, and servants, varied from about 50 to rather more than 300 per annum. The only cases of small-pox among this large staff occurred in 1884, 1892, and 1893. In 1884 there were 4 cases

among 283 attendants; in 1892, 2 cases among 138; and in 1893, 6 cases among 320. No cases occurred in any of the nine other years. Of these 12 cases of small-pox, 1 occurred within three days of commencing duties in the hospital ship, 1 within nine days, 4 within ten days, and 4 others within from twelve to fifteen days' service. It is further stated that none of these 12 recorded cases in the twelve years had been successfully re-vaccinated prior to the commencement of the incubation period, although the operation was in all cases attempted. Similar statistics were given by Mr. Sweeting with reference to the staff employed at the Western Small-Pox Hospital at Fulham. Mr. Marson, the well known surgeon to the Highgate Small-Pox Hospital, gave evidence to the select committee in 1871, to the effect that during the preceding thirty-five years no nurse or servant at the hospital had been attacked with small-pox. Since 1871 only 1 case, that of a gardener, has been attacked. Of the 137 nurses and attendants who have been engaged since 1883, 30 had had small-pox, some having been patients in the hospital, engaged as nurses or ward maids after their recovery; all the others were re-vaccinated upon entering the service, except the gardener referred to above, who took the disease. Thus at this hospital there was only 1 case of small-pox among the hospital staff during sixty years.

At the Sheffield Small-Pox Hospital, of 62 attendants who had only been vaccinated in infancy, 6 contracted small-pox, while of the 80 who had been re-vaccinated not one was attacked. At Warrington 2 of the hospital staff were attacked, being the only two who had not been re-vaccinated at the commencement of the outbreak. Six of the attendants at the Leicester Hospital refused to be re-vaccinated, five of whom contracted small-pox and one died; there was only one case of the disease, a mild one, among the larger number who had been re-vaccinated, that of a nurse re-vaccinated ten years before. Dr. Grimshaw, Registrar-General for Ireland, stated that in the Cork Street Hospital in Dublin, with which he was formerly connected, all the officers and servants were re-vaccinated, with the exception of one resident pupil, who refused to be re-vaccinated, and who died from small-pox. It seems useless to multiply this kind of evidence, which, so far as it relates to English hospitals of a more or less public character, is practically identical. While it cannot be asserted that the staff at small-pox hospitals, even if re-vaccinated, enjoy absolute immunity from the disease, the cases of attack have been so rare and exceptional as not substantially to modify the conclusion that re-vaccination affords practically complete protection even to nurses in personal attendance on small-pox patients. With regard to the exceptions, it is a well known fact that there are

both individual cases of exceptional susceptibility and individual cases of insusceptibility to small-pox. I personally knew a case of a young woman who was insusceptible both to vaccination and small-pox, who nursed several members of her family who were suffering from small-pox without taking the disease, and who later in life acted more than once as a small-pox nurse without any ill effects.

With a view to depreciate this evidence derived from English hospitals, the attention of the Commissioners was called to some evidence of a different character from other hospitals, notably to the experience at the Bicêtre Small-pox Hospital at Paris, and to a statement made by Mr. Porter, who was a short time medical officer to the South Dublin Union Hospital in 1871. In neither of these cases, however, did the evidence stand the test of cross-examination, and the Commissioners came to the conclusion that it did not materially affect the weight of the evidence derived from the hospital experience in this country.

Before quitting the discussion of the value of re-vaccination, it appears desirable to call attention to the accompanying Table VIII, reprinted from the "Final Report" of the Commissioners, showing the annual rate of mortality from small-pox in

TABLE VIII.—*Annual Rate of Mortality from Small-Pox per* 100,000 *living, in Prussia and Austria in the Twenty Years* 1862-81.

["Final Report," p. 91.]

Years.	Prussia.	Austria.	Years.	Prussia.	Austria.
1862	21·06	31·14	1872	262·37	189·93
'63	33·80	53·10	'73	35·65	323·36
'64	46·25	84·78	'74	9·52*	178·19
'65	43·78	45·53	'75	3·60	57·73
'66	62·00	36·85	'76	3·14	39·28
'67	43·17	74·08	'77	0·34	53·18
'68	18·81	33·27	'78	0·71	60·59
'69	19·42	35·18	'79	1·26	50·83
'70	17·52	30·30	'80	2·60	64·31
'71	243·21	39·28	'81	3·62	82·67

* Re-vaccination was made compulsory in Prussia in 1874.

Prussia and Austria during the twenty years 1862-81. It will be seen that re-vaccination was made compulsory in Prussia in 1874, a logical result of the almost universal epidemic of small pox in 1871-72. The striking contrast between the comparison of the Prussian and Austrian figures before and after 1874, affords conclusive evidence of the value of re-vaccination.

It has been urged by the anti-vaccinators that the real explanation of the exceptional immunity from the disease enjoyed by the staff of small-pox hospitals is not the effect of re-vaccination, but

is due to long and gradual exposure to the poison, by which the human frame becomes insusceptible to its effect. The Commissioners declare that facts do not support this theoretical explanation. In the first place, the exposure to the poison in a small-pox hospital cannot be described as gradual, and this theory, moreover, affords no explanation of the phenomenon that among the hospital attendants, very nearly all the re-vaccinated escape the disease, while those not re-vaccinated are attacked in such far larger proportions. Furthermore, as the Commissioners state in their final report, "the experience of almost certain immunity from the disease "in the case of successfully re-vaccinated attendants in small-pox "hospitals has no parallel in the cass of the staff in hospitals in "which other contagious or infectious diseases are treated."

At the London Fever Hospital a large number of typhus patients were treated during the ten years 1862-71, and the staff of attendants (including laundry women) averaged about 100; the number of cases of typhus among the staff averaged 19·2 per annum. The medical staff suffered severely during this period. In 1862 two medical officers caught typhus; in 1863 four medical officers successively caught typhus; in 1864 and 1865 a medical officer in each year contracted the disease; and in 1866 the resident medical officer died from the disease. It is evident that exposure to the influence of typhus poison does not protect the doctors and nurses from the disease; it is therefore only reasonable to prefer the theory that small-pox attendants are protected by re-vaccination, and not by "exposure to the influence of small-pox poison."

TABLE IX.—*Number and Proportion of Attendants, &c., who contracted Infectious Diseases* in the Metropolitan Asylums Fever Hospitals in the Nine Years* 1887-95.

["Final Report," p. 85.]

Year.	Metropolitan Asylums Board's Fever Hospitals.		
	Number of Attendants Employed, either Temporarily or otherwise, in the course of the Year.	Of whom there contracted Scarlet Fever, Diphtheria, or Typhoid during the Year.	
		Number.	Proportion.
			Per cnt.
1887	1,103	37	3·4
'88	Not known	35	—
'89	Not known	42	—
'90	1,312	53	4·0
'91	1,160	68	5·9
'92	1,652	121	7·3
'93	2,175	121	5·6
'94	2,182	111	5·1
'95	2,514	116	4·6

* Scarlet fever, diphtheria, or typhoid fever.

Before leaving this branch of the subject, it may be pointed out by way of contrast, that more than 5 per cent. of the attendants in the Metropolitan Asylums Board Fever Hospitals contracted either scarlet fever, diphtheria, or typhoid fever during six years ending with 1895; whereas among the attendants employed temporarily or otherwise in the Metropolitan Asylums Board Small-Pox Hospitals Ships during the twelve years 1884-95, the proportion who contracted the disease only amounted to 0·6 per cent. Thus the attendants in the Fever Hospitals appear to be more than eight times as liable to infection from scarlet fever, diphtheria, and typhoid fever than are the re-vaccinated attendants on the Small-Pox Hospital Ships to be infected by small-pox, although adults are, vaccination apart, far more likely to be infected by small-pox than by the diseases treated in the Fever Hospitals.

Proportional Mortality from Small-Pox among Vaccinated and Unvaccinated.

The six last local epidemics of small-pox in England, to which reference has before been made, were specially investigated by Local Government Board Inspectors or by medical men selected by the Commission, who made careful analyses of all the available statistics. Disregarding the incredulity of the opponents of vaccination of this class of statistics, it is necessary to refer to the evidence on this point afforded by the reports on these six epidemics. If the figures for the six towns are aggregated they afford more trustworthy results because they are larger. The number of unvaccinated cases of attack was 2,321, of which 822, or 35·4 per cent. proved fatal; the 1,449 cases under 10 years of age gave a mortality of 36·0 per cent., and 872 above that age a mortality of 34·3 per cent. The close agreement between the proportional mortality among unvaccinated cases under and over 10 years of age is very noteworthy. Excluding the 2,321 unvaccinated cases, from the 11,065 cases of attack recorded during the six epidemics, the remaining 8,744 gave 461 deaths, showing a mortality of only 5·2 per cent. Thus the total cases of attack, 11,065, showed a fatal percentage of 11·5; the 8,744 vaccinated cases, including all the doubtful cases, namely those stated to be vaccinated but bearing no marks, showed a mortality of 5·2 per cent., while the 2,321 unvaccinated cases showed a mortality of 35·4 per cent. The Commissioners in their final report pertinently ask, "how is this to be accounted for?" They ask whether this marked difference in the mortality of cases classed as vaccinated and unvaccinated can be a mere freak of chance. In reply they say that it is scarcely possible to believe that it can be so, more especially when it is found that the same contrast is exhibited on

comparing the figures for each of the six towns. The Leicester epidemic was marked by an unusually low case mortality, and the proportional fatality of the unvaccinated cases under 10 was only 14 per cent.; but then there were only two vaccinated cases under 10 years, and neither proved fatal.

Even admitting the possibility of mistakes in the classification of individual cases, "it cannot be doubted," says the report, "that "the great majority of the one class were vaccinated, whilst the "great majority of the other class were unvaccinated."

There was nothing new about the evidence afforded by these six recent epidemics, except that they were investigated by special inspectors chosen by the Commissioners or by the Local Government Board. The evidence, however, fully corroborated previous small-pox hospital statistics. Mr. Marson's observations during thirty-two years at the small-pox hospital, based upon 19,467 cases, showed a fatality of 36·5 per cent. among the unvaccinated, while the highest fatality among those bearing vaccination marks was 12·8 per cent. among cases with only one cicatrix. Dr. Gayton gave evidence concerning 10,403 cases at the Homerton Hospital between 1873 and 1884, showing a mortality of 10·5 per cent. among the vaccinated, including all doubtful cases said to be vaccinated but without marks, while among the unvaccinated the mortality was 43·4 per cent.; excluding the doubtful cases, the mortality among the vaccinated was reduced to 7·4 per cent. Mr. Sweeting's statistics of 2,584 cases at the Fulham Hospital in 1880-85 showed a total mortality of 16·5 per cent.; among the vaccinated and doubtful cases the percentage was 11·4, whereas among the unvaccinated it was 46 per cent. Eliminating the doubtful cases from Mr. Sweeting's figures, the mortality of the vaccinated class is reduced from 11·4 to 8·9 per cent.

This class of statistics has been subjected to much adverse criticism by the opponents of vaccination, on the ground that the case mortality of the unvaccinated shown thereby very far exceeds that of recorded small-pox prior to the introduction of vaccination. These objections are mainly founded on some small-pox statistics collected by a Dr. Jurin, which showed a case mortality of 16·5 per cent., and upon Bernouilli's figures, which are said to represent the case mortality of natural small-pox during the eighteenth century. Much doubt, however, was thrown upon the trustworthiness of these foreign statistics by evidence and cross-examination before the Commission, and while there is abundant and recent evidence of wide variations of case mortality in different epidemics, it is beyond question that the records of the London Small-Pox Hospital show a mortality of 25·3 per cent. during the years 1746-63, and that during the last twenty-five

years of that century the mortality was 32 per cent. We are bound, however, to base our conclusions mainly upon recent statistics, which are abundant and as a rule beyond suspicion.

It has, moreover, been urged that the marked difference between the case mortality of vaccinated and unvaccinated cases is not due to the protective effect of vaccination, but to the fact that the unvaccinated are mostly to be found among the poorer and more neglected classes of the population. This assertion may be accepted as to a certain extent true, inasmuch as it is a fact that small-pox mortality is in the main confined to the working classes. It is equally true, however, that the neglect of vaccination is also mainly confined to the same classes. The special reports on the six epidemics, moreover, conclusively show (especially the Warrington report) that the vaccinated and unvaccinated cases were not only of the same class, but were in fact to a very large extent members of the same families living in the same houses.

It has also been suggested that the excess of mortality among the unvaccinated is due to the inclusion among this class of those cases in which vaccination has been postponed on medical grounds, which cases consist, it is asserted, mainly of children of delicate constitution. The Commissioners, however, point out that the proportion of postponed cases is in the aggregate too small materially to affect these statistics, that postponement does not necessarily prove that the child is of a delicate constitution, and that a considerable proportion of the children whose vaccination is postponed is afterwards vaccinated.

Small-Pox Attack Rate among Vaccinated and Unvaccinated.

The medical experts selected to investigate and report upon five of the six recent epidemics to which reference has so often been made, endeavoured to collect statistics with a view to show the small-pox attack rate among the vaccinated and unvaccinated. This involved the necessity for ascertaining the numbers of vaccinated and unvaccinated persons exposed to risk in the several towns. The difficulties in the way of collecting such information are obvious, and these statistics were subjected to much adverse criticism by some of the Commissioners. It should be borne in mind, however, that the attack rate of small-pox depends primarily upon the liability to contact with sources of infection, and that there is a source of fallacy in the attempt to calculate attack rates on the *whole* vaccinated and unvaccinated population of a large town. The *bona fides* of the investigations being, however, beyond question, it seems desirable to refer briefly to these statistics, although from a pro-vaccination point of view they are far out-

weighed in importance and conclusiveness by the figures previously dealt with showing the almost absolute immunity from attack enjoyed by successfully re-vaccinated nurses and attendants in small-pox hospitals.

The Commissioners arrived at the conclusion, based upon a modification of Dr. Barry's figures, that Sheffield at the date of the epidemic, contained 266,797 vaccinated and 7,315 unvaccinated persons of all ages, and that the small-pox attack rate in these two classes of the population was 1·6 and 7·5 per cent. respectively. For reasons stated above, the value of these statistics is somewhat doubtful. Dr. Barry's statistics of the attack rate of the vaccinated and unvaccinated inmates of houses invaded by small-pox are not, however, open to equal objections. These houses contained, it is reported, 4,419 children under 10 years of age stated to be vaccinated, of whom 353 or 7·9 per cent. were attacked; while of the 337 unvaccinated children of the same age, 228 or 67·6 per cent. were attacked. Above 10 years of age the attack rate among the vaccinated and unvaccinated did not differ so widely, being 28·3 and 53·6 per cent. respectively, proving, what now needs no proof, that the protective effect of infant vaccination decreases with the lapse of years. Dr. Savill shows that in 437 houses infected with small-pox in Warrington, the attack rate was 4·4 per cent. among vaccinated, and 54·5 per cent. among unvaccinated children aged under 10 years; above 10 years of age the attack rate was 29·9 and 57·6 among the vaccinated and unvaccinated respectively. Very similar results were reported concerning the attack rate in invaded houses at the epidemics in Dewsbury, Leicester, and Gloucester; the figures will be found in the following table :—

TABLE X.—*Small-Pox Attack Rate of Vaccinated and Unvaccinated Persons under and over* 10 *Years of Age, in Five Towns in which Small-Pox Epidemics have recently occurred.*

["Final Report," p. 65.]

1 Towns.	2 Date of Epidemic.	3 Attack Rate under 10.	4 Attack Rate under 10.	5 Attack Rate over 10.	6 Attack Rate over 10.
		Vaccinated.	Unvaccinated.	Vaccinated.	Unvaccinated.
Sheffield	1887–88	7·9	67·6	28·3	53·6
Warrington	'92–93	4·4	54·5	29·9	57·6
Dewsbury	'91–92	10·2	50·8	27·7	53·4
Leicester	'92–93	2·5	35·3	22·2	47·0
Gloucester	'95–96	8·8	46·3	32·2	50·0

In view of these figures relating to invaded houses, it appears impossible to avoid the conclusion arrived at by the Commissioners, that the vaccinated at all ages are far less liable to be attacked by small-pox than the unvaccinated, and that the advantage in this respect enjoyed by vaccinated children under 10 years of age is greatly in excess of that enjoyed at a more advanced period of life.

Severity of Type of Small-Pox among Vaccinated and Unvaccinated.

Nearly all English small-pox hospital statistics during the past fifty years have shown that the type of small-pox suffered by the vaccinated is, as a rule, far less severe than that to which the unvaccinated are liable. That small-pox differs greatly in the degree of its severity is a well known fact; sometimes it is a comparatively trifling ailment, in other cases it is a very serious illness entailing the gravest after consequences. The most severe forms of the disease are known as malignant or hæmorrhagic; the confluent type is less severe, but still of a very serious character. Milder types have been described as coherent and discrete, and the mildest as varioloid or simply "mild." Much statistical information derived from the reports on recent epidemics was given to the Commissioners, bearing on the varying types of disease suffered respectively by vaccinated and unvaccinated patients in the small-pox hospitals. It will only be possible here to refer very briefly to these statistics. Of 825 vaccinated cases in the Sheffield Borough Hospital in 1887-88, 85·5 per cent. were mild or discrete, 13 per cent. coherent, and only 1·5 per cent. confluent; the 280 unvaccinated cases included no varioloid or mild cases, 17·9 per cent. discrete, 62·5 per cent. coherent, and 19·6 per cent. confluent. All the 27 vaccinated children under 10 years suffered from the varioloid or discrete type; while 74·6 per cent. of the 67 unvaccinated children had the disease of the coherent, and 6 per cent. of the confluent type. Thus the proportions of severe and mild forms of the disease among the vaccinated and unvaccinated were practically almost exactly reversed. No explanation of these ratios except the fact of previous vaccination or otherwise of the patients suggested itself to the Commissioners. In Dewsbury the vaccinated cases showed 8·2 per cent. of the confluent type, while 60·2 per cent. among the unvaccinated cases were of this severe type. It is needless to refer to these figures in greater detail. The following table gives a summary of these statistics for the epidemics in London, Sheffield, Dewsbury, Leicester, and Warrington:—

TABLE XI.—*The Incidence of Mild and Severe Cases of Small-Pox on Vaccinated and Unvaccinated Persons attacked during Five recent Small-Pox Epidemics.*

["Final Report," pp. 69 and 70.]

Local Epidemics.		Mild.	Severe.
London	vaccinated	89·0	11·0
	unvaccinated	35·2	64·8
Sheffield	vaccinated	82·8	17·2
	unvaccinated	18·5	81·5
Dewsbury	vaccinated	82·0	18·0
	unvaccinated	23·1	76·9
Leicester	vaccinated	81·4	18·6
	unvaccinated	27·2	72·8
Warrington	vaccinated	78·2	21·8
	unvaccinated	29·4	70·6

Note.—In this Table varioloid, or mild and discrete cases, are classed as "mild," and coherent or confluent cases as "severe."

It should be noted that the classification of the London cases differed somewhat from that adopted in the other towns, but the figures show very similar results. The main feature of the table is the practical agreement between the returns from the several towns. Thus the proportion of mild cases among vaccinated persons only ranged from 78·2 in Warrington to 89·0 in London; while among the unvaccinated the range was from 18·5 per cent. in Sheffield to 29·4 in Warrington and 35·2 in London.

It appears therefore that as regards the attack rate, the type of disease, and the fatality of small-pox, the vaccinated enjoy marked advantages when compared with the unvaccinated. The Commissioners ask, "what is to be said when it is found that "apart from the fatality of the disease, its type in the two classes "(vaccinated and unvaccinated) also differs, and perhaps even "more widely than its fatality does, and that the milder type "distinguishes the same class which exhibits the smaller fatality?" This cannot be mere chance coincidence, especially as the phenomenon is uniform in the case of epidemics in five different towns. The facts afford, it is admitted by the Commissioners, strong corroboration that the classification was on the whole accurately made, and that the cause of the different manner in which small-pox behaved to the two classes was vaccination. There was no material difference between the two classes except that one contained, with some possible exceptions, only unvaccinated persons, while the other consisted, certainly for the most part, of vaccinated persons.

Quality of Vaccination Tested by the Number and Nature of Marks.

This branch of the subject was fully investigated by the Commissioners. All the small-pox hospital authorities from Marson to the present time, appear to have been convinced that

TABLE XII.—*Proportional Mortality of Cases of Small-Pox treated in the Highgate Small-Pox Hospital, under the observation of Mr. Marson, in* 1836-51 *and* 1852-67, *among Patients bearing one or more Vaccination Marks.*

["Final Report," p. 76.]

Cases of Small-Pox classified according to the Vaccination Marks borne by each Patient respectively.	Percentage of Deaths in each Class respectively.	
	1836–51.	1852–67.
1. Stated to have been vaccinated, but having no cicatrix	21·7	39·4
2. Having one vaccine cicatrix	7·6	13·8
3. „ two „ cicatrices.....	4·3	7·7
4. „ three „ „	1·8	3·0
5. „ four or more vaccine cicatrices.....	0·7	0·9
Unvaccinated.....	35·5	34·9

the protective influence of vaccination bears a constant relation to the number and quality of the vaccination marks. Much evidence in support of this assertion, based upon recent experience, from which the following table is selected, was given before the Commission, and after a detailed analysis of this evidence

TABLE XIII.—*Deaths from Small-Pox in the Fulham Hospital of Persons under and over* 10 *Years of Age, with the Proportional Case Mortality among Patients with One or More Vaccination Marks.*

["Final Report," p. 75.]

	One Mark.			Two Marks.			Three Marks.			Four and over Four Marks.		
	Cases.	Deaths.	Death-rate.	Cases.	Deaths.	Death-rate.	Cases.	Deaths.	Death-rate.	Cases.	Deaths.	Death rate.
0—10.....	21	1	4·76	29	1	3·45	37	—	—	53	—	—
Over 10 years of age.....	384	41	10·68	509	46	9·04	459	37	8·06	396	19	4·80
At all ages....	405	42	10·37	538	47	8·73	496	37	7·45	449	19	4·23

the Commissioners state that it points to the "conclusion that "the greater the number of marks the greater is the protection "in relation to small-pox enjoyed by the vaccinated person," and that the statistics show a marked contrast between the

protection afforded by three or four marks, as compared with one or two. It is pointed out, moreover, that the figures given in the Sheffield, Leicester, and London reports indicate that the disease varies in its severity inversely with the number of the vaccination marks. The Commissioners declare that the evidence as to the influence of foveation and of the area of vaccination marks upon the amount of protection conferred by vaccination, was on the whole insufficient to enable them to draw any weighty conclusions.

The Injurious Effects of Vaccination.

This was naturally one of the subjects submitted for the inquiry and consideration of the Royal Commission. The opponents of vaccination not only deny its utility as a protection from small-pox, but assert that mischievous effects directly and indirectly result therefrom, causing injury and loss of life. The Commissioners declare that if vaccination may lead in certain cases to personal injury or even to death, this would afford no conclusive argument against its use, if its practice has been productive of substantial benefit in limiting the ravages of small-pox. The objectors to vaccination have adopted two lines of attack with a view to prove that it causes disease and death. Speciously arranged Parliamentary Returns have been asked for, showing the concurrent increase of vaccination and of deaths referred to different diseases; and public attention has also been directed to individual cases in which injury or death has been attributed to vaccination. Much evidence was taken with a view to throw light upon these charges. With regard to Mr. Hopwood's Return, which was intended to prove the malign influence of vaccination, Dr. Ogle gave some valuable evidence, showing that of the fourteen diseases dealt with in the return, some had increased and some had decreased in mortality. He pointed out that the line of reasoning which had been considered by some to justify the assertion that vaccination has produced, in those who have been subjected to it, serious diseases, would equally justify the assertion that it has rendered them largely exempt from other diseases no less serious. He showed for instance that the mortality from phthisis, pneumonia, and convulsions, among other diseases, has markedly declined since vaccination has been more generally practised. The Commissioners point out that Dr. Ogle does not, of course, suggest that vaccination has caused this decline, but he asks, and they think the question a pertinent one, why vaccination should be debited with the increase of diseases which have increased, and not credited with the decrease where the mortality has diminished. It is beyond question that the mortality of infants from all causes has not only not increased with the increased practice of vaccination, but it has considerably

declined. With regard to the mortality from specific diseases, that of infants attributed to syphilis has undoubtedly increased in the last twenty years, and this is not the place to discuss whether the increase is a real increase, or the result of improved diagnosis of cases of congenital disease. This increase of infantile syphilis has been persistently attributed to vaccination, but the Commissioners were convinced by the evidence given on this point that the increase was considerably greater under the age of 3 months, when it could not have been caused by vaccination, than it was in the later part of the first year of life. It was moreover given in evidence that the increase of fatal infantile syphilis, based upon a comparison of the years 1863-67 with 1883-87, was far greater in Leicester, where the practice of vaccination had been practically disused, than in England and Wales generally. The increase in the mortality of infants aged under 1 year from syphilis (in the above mentioned period of twenty years), which was 24·7 per cent. in England and Wales, was equal to 69·3 per cent. in Leicester. This does not of course imply any connection between the disuse of vaccination and the increase of infantile syphilis, but it conclusively rebuts, as the Commissioners point out, the attribution of the increase of mortality from syphilis to vaccination.

Similar attempts to attribute increased mortality from cancer, erysipelas, tabes mesenterica, scrofula, pyæmia, bronchitis, diarrhœa, and skin diseases to vaccination were investigated before the Commission with similar results. Upon this branch of the inquiry the Commissioners summarize in the following words: "Upon the whole we think that the evidence is overwhelming to "show that in the case of some of the diseases referred to, vac- "cination cannot have produced any effect upon the mortality "from them, and that it has not in the case of any one of them "increased the mortality to a substantial, we might even say an "appreciable, extent."

With regard to the evidence of personal injury or death resulting from vaccination, the Commissioners admit that it is beyond doubt that such cases have occurred. The recent returns of the Registrar-General contain a heading, "cow pox and other "effects of vaccination," and Dr. Ogle gave evidence to the effect that during the nine years 1881-89, 476 deaths were classed to this heading, showing a proportion of one such death to 14,159 primary vaccinations. To this heading is classed every death the medical certificate relating to which assigns vaccination as the cause or the contributory cause of death. There is abundant proof that in many cases the association of vaccination with the cause of death was not intended by the certifying practitioner to indicate that the disease which ended fatally was due to vaccination. On the other

hand, however, cases came to the knowledge of the Commissioners in which, although the fatal illness was engendered by vaccination, this circumstance was not referred to in the medical certificate. The evidence did not enable the Commissioners to decide which of these two classes of cases was the more numerous. About half the deaths attributed to the effects of vaccination were caused by erysipelas, and if the cases of pyæmia, septicæmia, and blood poisoning be added, they together account for two-thirds of the cases. There is conclusive evidence that most of the deaths assigned to "the effects of vaccination" occur among the lower grades of the working classes, and are frequently attributed by the certifying practitioner to neglect, want of cleanliness, and in fact to the filthy surroundings of the infant. It may be noted that of the 43 deaths referred to "cow pox and the effects of "vaccination," in 1891, 36 were of the infant children of mechanics, artizans, or labourers, or of the illegitimate children of domestic servants; 4 were described as the children of shopkeepers or of shop assistants, 2 as children of commercial clerks, and 1 as the child of a farmer. Not one occurred among those classes in which due and intelligent care of infants can, as a rule, be assured.

The conclusion at which the Commissioners arrived on this branch of the subject, after a careful examination of the facts and consideration of the evidence, is stated in the following words: "Although some of the dangers said to attend vaccination are "undoubtedly real, and not inconsiderable in gross amount, yet "when considered in relation to the extent of vaccination work "done, they are insignificant. There is reason further to believe "that they are diminishing under the better precautions of the "present day, and with the addition of the further precautions "which experience suggests will do so still more in the future." In another place the Commissioners say: "In our opinion, if the "precautions we have suggested were adopted, untoward incidents "of vaccination, already rare, would become much rarer."

Proposed Means, other than Vaccination, for diminishing the Prevalence of Small-Pox.

This subject was specially referred to the Commission for inquiry and report, and the final report contains an interesting summary of the evidence on this point, which is only indirectly connected with vaccination and small-pox statistics. The opponents of vaccination not unnaturally point to the results of the Leicester epidemic of 1892-93, as affording evidence that effective notification and prompt isolation exercise a powerful influence in the control of a small-pox epidemic. To such an assertion no one will be inclined to take exception, although there appear to be

no grounds for attributing the exceptionally low rate of case mortality in Leicester to the energetic measures adopted by the Sanitary Committee for coping with the epidemic. The Commissioners, however, on the general question state that they can see nothing to warrant the conclusion that in this country vaccination might safely be abandoned, and replaced by a system of isolation, and that if such a change were made in our method of dealing with small-pox, it is impossible to contemplate the probable consequences without dismay. While they are very far from underrating the value of isolation, they point out that what it can accomplish as an auxiliary to vaccination is one thing, and whether it can be relied on in its stead is quite another.

The Dissent Report of Dr. Collins and Mr. Picton.

Having read with careful attention this dissent report, I fail to discover therein any serious attempt to combat the important conclusions at which the large majority of the Commission arrived respecting the influence of vaccination as a protection against small-pox. It is mainly a summary of all the most damaging statements that have been made by the opponents of vaccination, without too critical a regard to the source or entire credibility of these statements. For instance, on page 171 it is stated that "In "1828 a severe epidemic broke out at Marseilles, and 2,000 vacci- "nated persons caught the disease." No authority is given for this statement,[3] and no further information as to the total number of cases is given; indeed it might be assumed that the epidemic only attacked the vaccinated. Then paragraph 72 states "The "vaccinated, nowadays, generally constitute the majority of the "patients in small-pox hospitals, and in certain limited outbreaks "only vaccinated persons have been attacked." Such statements may be verbally correct, but they are certainly not judicial in tone, and are liable to be misunderstood and misused. It is, however, to the illogical use of statistics that special notice of this minority report seems called for in this paper. The dissentients assert that "in proportion as the ratio of the vacci- "nated to the unvaccinated in the hospitals approximates to that "obtaining outside (assuming the admissions to be a fair sample "of the whole cases) we must regard the protection of small-pox as "approximating to *nil*." Let us imagine the existence of so perfect a system of infantile vaccination that the whole population had been vaccinated in infancy. According to present information such a condition (without re-vaccination) would not prevent small-pox

[3] I regret to find that I overlooked a marginal reference to the authority for this statement. Further comment on this statement will be found in my remarks on the discussion following the reading of this paper, on p. 550.—(N.A.H.)

epidemics, but all the inmates of small-pox hospitals would necessarily be vaccinated, and they might then include no children under 10 years of age. Dr. Collins and Mr. Picton assert that such a state of things would prove that the protective influence of vaccination was *nil*. This fallacy underlies all the attempts to prove that the increased proportion of vaccinated cases of small-pox since the increased practice of vaccination proves the uselessness of the operation. Then paragraph 90 asserts, "Whatever "influence vaccination may exert against small-pox, then, would "appear to lie somewhere between none at all on the one hand, "and very considerably less than that of a previous attack of "small-pox on the other." What about the protection of childhood, should it have been ignored? Again, it is stated that "when large figures are taken, the fatality of small-pox now, "with a large majority of the cases protected by vaccination, "is about the same as it was last century, when none of the "cases had received any protective rite." The fact is we have very little information as to the case mortality of small-pox in the last century, and that little appears to be of doubtful trustworthiness. It is probable that we shall find much of this dissent report quoted and used in anti-vaccination literature, but we doubt whether it will exert much influence upon expert opinion.

The dissentients are perfectly logical in recommending the repeal of the compulsory clauses of the Vaccination Acts, perhaps more logical than the majority of the Commissioners, who conclude a report teeming with evidence of the value of vaccination, by recommending a course of action which would practically make the compulsory clauses a dead letter, without repealing them.

The Gloucester Epidemic.

Before proceeding briefly to summarize the conclusions to be deduced from the vaccination and small-pox statistics contained in the reports and evidence issued by the Royal Commission, it seems desirable to call attention to a few of the more salient features of the quite recent remarkable epidemic at Gloucester. The facts are partly derived from the excellent report issued by the committee appointed by the Gloucester Board of Guardians, under the advice and superintendence of Dr. Bond, and partly from other sources. In February, 1887, the Board of Guardians by a majority of 12 to 10 out of 30 present, resolved to take no further steps to enforce the compulsory clauses of the Vaccination Acts. The result of this resolution was that although 14,212 births were registered within the Union of Gloucester during the nine years 1887-95, only 1,283 or 9·7 per cent. were recorded as successfully vaccinated. The epidemic broke out in the latter part of 1895,

and speedily assumed alarming proportions after the beginning of 1896; 51 cases were notified in January, 142 in February, 628 in March, and the maximum monthly number, 779, in April. Under the influence of the panic caused by the epidemic, the public vaccinators towards the end of January had their hands full, and private practitioners were equally active. The pressure at the public stations became so great that two deputy public vaccinators had to be appointed, and some of the public elementary schools, which had been closed owing to the epidemic, were used as vaccination stations. Measures were taken by the Town Council to secure the services of six qualified practitioners to go from house to house and to vaccinate as many as could be induced to submit to the operation. This visitation commenced on the 6th of April, and on the 21st of the same month a special vaccination committee was appointed for organising and carrying out this house to house vaccination. Dr. Bond, who was invited to undertake the organising and superintendence of the work, selected Dr. Ernest Carter, of Cheltenham, to act as his deputy. The Guardians, moreover, on the 24th March, had rescinded their resolution not to enforce vaccination, and after due notice a few prosecutions were sufficient to secure the vaccination of most of the children that remained unprotected after all powers of persuasion on their parents had failed to produce the desired effect. The public elementary schools were re-opened on the 1st June to all children who had been vaccinated. No fewer than 8,400 children under 10 years of age were vaccinated in Gloucester during the five months ending on the 31st May. When this systematic house to house visitation, and the accompanying wholesale vaccination and re-vaccination was completed, the epidemic rapidly died out. Gloucester, which in the year 1892 headed the record of badly vaccinated communities in England and Wales, showing a percentage of 86·9 of children born in that year and not accounted for in the vaccination returns, is now, probably both in regard to its child and adult population, one of the best vaccinated towns in the kingdom. It is now necessary to point out the cost of life and suffering at which this wonderful conversion has been effected.

The first case of small-pox was notified in May, 1895, but the cases were few until the close of the year. The total cases reported up to the end of July (when the epidemic ceased) in the city and suburbs was 2,036, of which 1,981 occurred within the city. The total number of deaths, according to the local report was 443,[4] showing a total case mortality of 21·8 per cent.

[4] It should be noted that 447 deaths from small-pox were registered within Gloucester Union and Registration District during the eight months from December, 1895, to July, 1896, both included.

This affords striking contrast to the case mortality at other recent epidemics, which ranged from 5·8 in Leicester, to 9·7 in Sheffield, and 10·7 in Dewsbury. Of the 2,036 cases in Gloucester only 730 were admitted to the Isolation Hospitals, the remainder being treated on the premises in which they occurred. The case mortality was 27·3 per cent. in hospital, and 18·7 per cent. among those cases treated at home. The 199 deaths in the hospital included 125 or 62·8 per cent. of unvaccinated children under 10 years of age. The case mortality of all cases under 10 years of age (all but one of the 280 deaths being of unvaccinated children) was 39·2 per cent.; while the case mortality between 10 and 20 (at which ages the vaccinated were more than five times as numerous as the unvaccinated) was under 7 per cent. Between 20 and 30 the case mortality was 9·5 per cent.; between 30 and 40 it was 15·2 per cent.; and over 40 it was 19·4 per cent. These figures appear to afford an indication of the decreasing effect of infantile vaccination on the protection of adult life from fatal small-pox. The age incidence of the cases of attack are noteworthy. Only 2 per cent. of the vaccinated cases were under 10 years of age; whereas of the unvaccinated cases no less than 88 per cent. were of children under 10 years of age. Among the fatal vaccinated cases less than 1 per cent. was of patients under 10 years of age, while of the unvaccinated the proportion was 88 per cent. Dr. Bond in his report, from which most of these figures are taken, calls special notice to the fact that in his classification "vaccinated" only means vaccinated in infancy, and points out that the measure of success which has attended the attempts of anti-vaccinators to discredit vaccination among ill-informed persons is to a great extent due to the fallacy of assuming that the word "vaccinated" has in all cases a precise and uniform meaning. This fallacy makes it comparatively easy to misinterpret the lesson which vaccination statistics, if correctly appreciated, teach. "Vaccinated" may indeed mean anything, as Dr. Bond says, from the fleeting protection given by a single poor vesicle, to the almost perfect and long-protracted immunity which is, as a general rule, conferred by three or four good vesicles.

It should, moreover, be noted that the 2,036 cases of attack during the Gloucester epidemic did not include a single death of a person who had been successfully re-vaccinated within ten years, and not less than one month previous to exposure to infection. With reference to the influence of vaccination in modifying the severity of the disease, Dr. Bond points out that the inspection of a hospital ward full of small-pox cases, with information as to their vaccination antecedents, converted many doubters in Gloucester who had been proof against other forms of evidence.

It is very much to be regretted that the information given in the medical certificates relating to the vaccination or otherwise of the 447 fatal cases of small-pox registered within Gloucester registration district during the epidemic was singularly incomplete. Of these, 39 were described as vaccinated, including 6 cases of children aged under 10 years, in which vaccination had taken place during the incubation period; 96 were returned as unvaccinated, and the remaining 312 were "not stated" as to vaccination, although it is evident from Dr. Bond's report that information on this point was available.

In the special reports on all recent small-pox epidemics it has been abundantly proved that deaths from small-pox are in the main confined to the lower strata of society. Anti-vaccinators sought to convince the Royal Commissioners that this fact was a natural result of low sanitary condition. The more probable explanation is, however, that anti-vaccination agents meet with greater success in advocating their doctrine among the so-called working classes, who are necessarily ill informed on the subject, and whose natural prejudice to the operation on their children is the more easily excited. It is an undoubted fact that vaccination is almost universally practised among the educated classes.

The Gloucester death register has been examined with a view to ascertain the rank or occupation of the 447 persons whose deaths resulted from small-pox in 1895-96. Three cases were of adult females aged respectively 32, 40, and 55, one the wife of a minister of the Gospel, and two described as of independent means; but not a single child belonging to the professional or upper middle classes died from small-pox during the epidemic. The deaths of two commercial clerks and of one school teacher were recorded, and 40 deaths of small shopkeepers or shop assistants, or of their relations. The remaining 401 fatal cases included 178 of dock or general labourers, 168 of artizans, mechanics, &c., 39 of railway employés, 5 of domestic servants, and 11 of persons of unknown occupations, or of their wives or children respectively.

Summary of Conclusions.

With due regard to the figures dealt with in this paper, and of the source from which they have been derived, it appears impossible to avoid the following conclusions:—

1. That the mean annual death-rate from small-pox at all ages in England and Wales, which was 408 per million in the twelve years for which records exist prior to compulsory vaccination, fell to 126 per million in the forty-two years since vaccination was made compulsory, which period includes the world-wide epidemic of 1871-72.

2. That the main part of this decline of mortality occurred among children under the age of 10 years, who may be presumed to have been principally affected by the increase of infant vaccination.

3. That the age incidence of fatal small-pox has entirely changed under the influence of increased infant vaccination; and that small-pox from being mainly a disease of childhood, is now proportionally more prevalent among adults.

4. That judged by the statistics of the last six principal local small-pox epidemics, the proportion of deaths of children bears a constant ratio to the proportion of children officially returned "unaccounted for" as regards successful vaccination.

5. That efficient infant vaccination confers a practically complete immunity from fatal small-pox during the first 10 years of life.

6. That the increase in the proportion of adult deaths from small-pox must be attributed to the waning of the protective effect of infant vaccination; this hypothesis being corroborated by the steady increase in the proportional case mortality of vaccinated persons at successive age-periods above 10 years in recent epidemics.

7. That both the small-pox attack-rate and the case mortality is far lower at all ages among those who have been vaccinated in infancy than among the unvaccinated.

8. That the type of disease suffered by small-pox patients is far more severe among the unvaccinated than among the vaccinated; and that the severity of the type appears to vary with the number and quality of the vaccination marks.

9. That judged by the statistics of small-pox hospital nurses and attendants, successful re-vaccination affords practically complete protection to adults, even to those brought into actual personal contact with the worst forms of the disease.

Suggested Amendment of the Vaccination Acts.

It is impossible, in conclusion, to omit a brief reference to some of the recommendations signed by eleven of the thirteen Commissioners. At the end of the Report, which teems with admissions of the efficacy of vaccination as a protection from small-pox, and immediately following a paragraph in which the Commissioners express the hope that their report "will stimulate belief in the "efficacy of vaccination, that it will remove some misapprehensions, "and reassure some who take an exaggerated view of the risks "connected with the operation, as well as lead to a more ready "enforcement of the law by local authorities," it is actually suggested that a statutory declaration made by a parent to the effect that he entertains an objection to the practice of vaccination, should be allowed to bar any proceedings under the compulsory clauses of the Vaccination Act. It may be, and

possibly is true, that the opposition to vaccination has been stimulated by repeated prosecution of persons who pose as martyrs to compulsory vaccination, but, in view of such statistics as have been published by this Commission, it may well be doubted whether the State would be justified, in deference to the opposition of mistaken and misguided persons, however honest, in imperilling the lives of thousands of children who would remain unvaccinated as a result of the proposed relaxation of the law. With a view to evade the necessity for the prosecution of the small minority who remain unconvinced of the value of vaccination, it might be expedient to allow, subject to such restrictions as would exclude the merely indolent and careless parents, an extension of the power of postponement of vaccination for limited periods, renewable on formal application. In order, however, to counterbalance the effect of a probable large increase of such postponements, it would appear to be necessary to give statutory power to some local authority to examine all children on admission to any public elementary school, and to prosecute the parent of any child then unvaccinated. This examination would prove of incalculable value, by affording an opportunity to promote the re-vaccination of all children, at the public expense, before the conclusion of the school period.

With the various suggestions for changes in the practice of vaccination, in order to minimise the risks of vaccination, and to reduce as far as possible the prejudice against the operation, it is impossible but to sympathise and to endorse the opinion of the Commission, that if carried into effect they would probably tend to reduce the organised opposition to infant vaccination. To one of these suggestions special reference may be made, namely, that the period during which vaccination is voluntary should be extended. It may be noted that the age for compulsory vaccination in Scotland is six months, and in Germany the operation may be postponed until the end of the second year of life. The evidence bearing upon the practice of compulsory vaccination under these conditions in Scotland and in Germany, where practically no organised opposition exists, seems to point to the conclusion that if the period of voluntary vaccination in England were extended to six months, or even to one year (except in the presence of epidemic prevalence of small-pox), the opposition in this country would be reduced to a minimum.

If this Paper should, to ever so slight an extent, decrease the probability of the adoption of the dangerous experiment of offering facilities to the ill informed parents, who constitute the main opponents of vaccination, for finally evading the vaccination of their children, I shall consider that it has not been written in vain.

APPENDIX.

TABLE XIV.—*Proportional Deaths from Small-Pox at each of Six Age-Periods to* 1,000 *Deaths from that disease at all Ages in each of the Years* 1848-95.

["Final Report," p. 154, with the addition of the figures for 1895.]

Year.	Under 1.	1—	5—	10—	15—	25—	45 and upwards.
1848.....	235	457	130	37	72	58	11
'49.....	250	427	145	35	65	60	18
1850.....	268	432	133	35	65	55	12
'51.....	258	439	131	33	68	59	12
'52.....	267	426	122	32	75	62	16
'53.....	273	413	123	31	71	70	19
'54.....	203	388	128	31	108	107	35
'55.....	194	321	135	31	135	143	41
'56.....	231	329	122	40	134	108	36
'57.....	243	345	164	31	94	98	25
'58.....	234	319	173	39	105	106	24
'59.....	252	327	126	44	116	104	31
1860.....	232	324	112	42	121	132	37
'61.....	242	295	108	47	125	126	57
'62.....	231	328	110	45	122	125	39
'63.....	236	308	105	37	129	140	45
'64.....	243	312	105	37	119	140	44
'65.....	233	272	102	41	134	163	55
'66.....	222	320	99	32	136	146	45
'67.....	239	298	86	31	133	160	53
'68.....	239	351	102	31	115	123	39
'69.....	221	327	126	30	111	136	49
1870.....	179	284	143	38	140	170	46
'71.....	135	199	149	56	181	221	59
'72.....	137	162	164	66	191	214	66
'73.....	132	99	138	62	224	258	87
'74.....	129	100	107	70	263	258	73
'75.....	106	101	108	80	261	254	90
'76.....	119	135	108	67	214	286	71
'77.....	102	145	112	72	216	270	83
'78.....	119	135	117	77	213	255	84
'79.....	116	127	119	63	187	265	123
1880.....	120	142	117	76	196	267	82
'81.....	103	136	109	68	205	276	103
'82.....	98	111	77	61	226	325	102
'83.....	131	104	95	62	239	262	107
'84.....	114	116	92	71	214	302	91
'85.....	120	126	79	63	185	312	115
'86.....	113	80	65	40	189	313	200
'87.....	121	73	61	61	283	328	73
'88.....	119	81	63	49	230	329	129
'89.....	86	43	—	43	261	437	130
1890.....	188	63	—	—	188	373	188
'91.....	246	102	61	61	82	285	163
'92.....	117	148	77	9	132	359	158
'93.....	141	142	66	30	110	305	206
'94.....	140	133	45	28	143	367	144
'95.....	153	130	63	27	139	327	161

Note.—The deaths for the years 1848-54 unavoidably include those referred to chicken-pox.

TABLE XV.—*Death-Rates from Small-Pox per Million Living at all Ages and at Six Age-Periods in each of the Years* 1848-95.

["Final Report," p. 155, with the addition of the figures for 1895.]

Year.	All Ages.	Under 5.	5—	10—	15—	25—	45 and upwards.
1848....	397	2,090	439	135	149	86	23
'49....	264	1,364	326	86	90	59	26
1850....	262	1,400	298	86	89	54	18
'51....	389	2,066	438	121	139	86	25
'52....	401	2,117	420	119	158	93	34
'53....	171	892	180	50	64	45	17
'54....	151	675	165	44	86	61	28
'55....	131	512	151	39	93	70	28
'56....	116	491	122	44	82	47	22
'57....	202	891	283	59	100	75	27
'58....	330	1,364	489	121	185	132	42
'59....	193	835	208	82	119	76	31
1860....	136	564	130	54	87	67	27
'61....	64	256	59	28	43	30	19
'62....	78	322	73	33	50	37	16
'63....	286	1,153	255	101	198	151	67
'64....	364	1,500	325	126	232	193	83
'65....	301	1,127	260	117	217	187	86
'66....	139	558	117	41	102	78	33
'67....	114	453	82	33	82	69	31
'68....	91	396	78	27	56	43	18
'69....	67	271	71	19	40	35	17
1870...	113	388	136	40	86	74	27
'71....	1,012	2,502	1,265	529	994	860	306
'72....	821	1,815	1,130	503	851	676	279
'73....	98	167	114	57	119	98	44
'74....	88	148	79	57	125	87	34
'75....	35	54	32	26	49	35	16
'76....	99	185	89	62	113	108	37
'77....	173	316	161	116	201	180	76
'78....	74	139	72	53	85	73	33
'79....	21	38	21	12	21	22	14
1880....	25	49	24	18	26	26	11
'81....	119	210	107	75	130	127	65
'82....	50	78	32	28	60	63	27
'83....	36	64	28	20	46	36	20
'84....	83	145	63	54	93	96	40
'85....	104	197	69	60	101	123	63
'86....	10	15	5	4	10	12	11
'87....	18	28	9	10	27	23	7
'88....	36	58	19	16	44	45	25
'89....	1	1	—	—	1	1	1
1890....	1	1	—	—	1	1	1
'91....	2	5	1	1	1	2	1
'92....	15	32	10	1	10	20	12
'93....	49	105	26	12	26	65	49
'94....	27	61	11	7	20	38	21
'95....	7	17	4	2	5	9	6

Note.—The rates for the years 1848-54 unavoidably include the deaths referred to chicken-pox.

Discussion *on* Mr. Humphreys's Paper.

Dr. W. J. Collins appreciated the courtesy of having been invited to the meeting, and regretted the absence of the lecturer. He wished to make it clear that he did not represent any section or body on the Royal Commission, but only himself, and went there endeavouring to ascertain the true facts of the case. His name having been mentioned in the paper, he felt bound to say a word on those points in which reference was made to himself and Mr. Picton. He might say that the document which he and Mr. Picton had signed should not technically be termed a minority report, as they intended rather that it should supplement in some important respects the report of the Commission in endeavouring to furnish a more complete and satisfactory view of the facts laid before them. Mr. Picton and he felt that the conclusion arrived at in what was called the majority report was illogical, in which belief they appeared to agree with Mr. Humphreys. The first point made with regard to the so-called minority report was on p. 532, where the author said that no authority was given for the statement that "in 1828 a severe epidemic (of small-pox) broke out at Marseilles and 2,000 vaccinated persons caught the disease." Turning to p. 171 of the report, in which that matter was dealt with, he found there was a side reference to vol. i, Appendix, p. 74, which gave Sir John Simon's authority for that statement. An important paper on this same subject was read before that Society some years ago by Dr. Guy, and if it had received a little more consideration a statistical mistake might have been corrected in it which had disfigured subsequent literature on the subject. Then Mr. Picton and himself were accused of making an illogical use of statistics, but he maintained that the want of logic was on the part of the writer of the paper. Mr. Humphreys quoted a portion of a paragraph in which they were comparing, as had been suggested should be compared, the proportion of vaccinated to unvaccinated of the total population, with the proportion of the vaccinated and unvaccinated in the small-pox hospitals, and they argued that if vaccination were an absolute protection you would expect to have no vaccinated patients in the hospitals, and if it were a very great protection you would not expect to have a very large proportion; and it was said in their report that in proportion as the ratio of the vaccinated to the unvaccinated in the hospitals approximated to that obtaining outside, so in a rough way, taking the vaccinated in the lump, the protection approximated to nil. But Mr. Humphreys went on to assume a condition of things in which there were 100 per cent. vaccinated in the hospitals. But the argument was only available so long as there was a quantum of each to be compared. Then the writer of the paper quoted the following paragraph: "Whatever influence vaccination may exert against small-pox then would appear to lie somewhere between

none at all on the one hand, and very considerably less than that of a previous attack of small-pox on the other." It was apparently suggested that there was not sufficient ground for asserting that the protection of small-pox against small-pox was greater than that of vaccination. But on p. 515 of the paper that very position was conceded, viz., "infant vaccination does not afford a protection from small-pox equivalent to that conferred by an attack of small-pox." Therefore what protective influence there might be must be somewhere between none at all on the one hand and less than that of a previous attack of small-pox on the other. Mr. Humphreys further stated that the important question of age-incidence had not been dealt with. But clause after clause of the minority report dealt with this question (see clauses 131 to 148). It was an undoubted fact that there was a change in age-incidence, but there had also been a change in age-incidence in other diseases, and it was important to consider, when alleging that infantile vaccination had altered the age-incidence of small-pox, whether in other diseases of a similar character there had not been a shifting of age-incidence where no special artificial protective was applied. They ought to realise the very important influence which isolation had on the matter. Lord Shaftesbury said it was largely a question of house accommodation, but he (Dr. Collins) relied still more on the isolation system which had been adopted in London in 1885, when the hospital ships were established, and which appeared to have had a very remarkable effect on the reduction of small-pox. Sir James Simpson laid it down that isolation was the chief and leading measure required to stamp out small-pox epidemics, and experience gathered in London, Australia, and Leicester certainly supported that view. All the commissioners at any rate agreed that it was undesirable to enforce vaccination on those who regarded it as useless and dangerous. Speaking roughly, there were two methods of dealing with infectious disease, viz., the inoculatory method on the one hand, and isolation with sanitary organisation on the other. To secure such protection as vaccination could give, it was urged that every individual should be operated on every ten years; this was impracticable, whereas an isolation system was accepted even in places where vaccination had been strongly resisted.

Dr. G. B. Longstaff said that Dr. Collins had not reminded the Society that isolation hospitals themselves were not without their dangers, as had been proved: dangers to the individuals who might be there brought in contact with other diseases, and also to the neighbourhood. He would also like to call attention to the fact that isolation had only been carried out on anything like a successful scale comparatively recently, and that the mortality from small-pox began to fall off, as he should say, under the influence of vaccination many years before anything like efficacious isolation. On those matters which could be proved by statistics in relation to disease or causation of disease, there appeared to him to be three which stood forward somewhat clearly: the first that bronchitis was associated with low temperature; the second that

diarrhœa was associated with high temperature; and the third that small-pox and vaccination were opposed to one another. He was inclined to think that, if one applied the various logical methods together, of those three occurrences that which exhibited the closest parallelism was the presence or absence of vaccination with the absence or severity of small-pox; in short, no question in medical statistics was so clearly demonstrated to his mind as the value of vaccination, and if statistics failed to prove the value of vaccination, they failed to prove any medical fact whatever to which they had been applied. Some people might say that nothing could be proved by statistics, but he was strongly of opinion that anyone who read the paper purely from a statistical point of view would say the demonstration was as complete as it could be. There was one thing which could only be appreciated by those who had seen small-pox (and attention had been called to this by Dr. Bond in his report on the epidemic at Gloucester). Anyone going into a small-pox hospital could see the result of vaccination. Of course it was not given to many to see small-pox, but he had seen a few cases, and he should never forget the effect produced on him in St. Thomas's Hospital by seeing two cases of confluent small-pox, one on either side of the ward. The eruption was exactly the same in the two cases, and his then teacher, Dr. Murchison, said: "Gentlemen, I wish you to notice these two cases; they are both cases of confluent small-pox, and the eruption is exactly the same in the two, but this one will live and that one will die; they have reached the same day of the disease, but that one has the secondary fever and that one has not; that one has not been vaccinated, and this one has." He remembered very well that a few days sufficed to prove the absolute truth of the prognosis. He was sure if disbelievers in vaccination went into a small-pox hospital they would very soon be converted.

Lieut.-General A. Phelps regretted that this long and interesting paper was not circulated some days before the meeting, for it was impossible for anyone to read it on arrival and be prepared with a reply. The last speaker had apparently not grasped the fact that what the Royal Commission approved in the way of vaccination was vaccination in the abstract. Arm to arm vaccination was condemned by them, and variolous lymph taken from calves recommended. The commission was unfortunate in one respect, that there was not a single anti-vaccinist upon it. They excused the delay of seven years in submitting their report on the ground that they wished to give "full scope" to the opponents of vaccination. He was known to be an opponent to a certain extent, and having found in the course of his investigations that statistics were habitually falsified by inaccurate classification, proposed to give evidence as to the truth of the statistics on which the commission had to found its conclusions, because it could adduce no scientific theory for the practice. To his surprise the commission refused to hear his evidence; and his was not the only case in which evidence had been refused or suppressed. With regard to the decline of small-pox fatalities since vaccination was made

compulsory, he would point out that if vaccination was the cause, there was another condition which must have resulted, viz., that those places where vaccination had been neglected ought to be suffering from the same amount of small-pox as characterised the last century. But, as a matter of fact, Leicester was conspicuous for the reduction of small-pox which had gone on since vaccination had been given up. In the epidemic of 1871-72, with a population of 100,829, when all were vaccinated, the number of cases in Leicester was about 3,297, with 346 deaths. But in 1891-94, when vaccination had been greatly neglected, and the population was 184,547, they had only 360 cases and 21 deaths, and some of those 21 were due to the abandonment of the system of isolation, which had obtained in Leicester before that time, owing to an unfortunate mistake by which small-pox was diagnosed as chicken-pox. They had 40,000 to 50,000 unvaccinated children in the town, but there was an exceedingly small amount of small-pox among them. Birmingham too was vaccinated up to the eyes. They had two epidemics there, in 1871-72 and 1891-94. In the former, with a population of 343,787, they had 7,347 cases and 1,229 deaths; and in the latter, with a population of 492,301, they had 3,127 cases and 248 deaths. The attack rates per thousand at the two epidemics were thus 21·3 and 6·3 respectively. While therefore there was a reduction in the second epidemic, yet it had been by no means as great as that at Leicester, where the corresponding attack rates were 32·7 and 1·9 in the two epidemics. The decline of small-pox mortality amongst children under 10 years of age also took place in Leicester, though the numbers in the second epidemic were so small that it was scarcely possible to draw conclusions from them. It should also be borne in mind that Leicester, by giving up vaccination and adopting sanitation instead, had enormously decreased the children's death-rate, thus greatly increasing the child population of the town. With regard to the marked change of age-incidence of small-pox being connected with the increase of vaccination, he would point out that in London vaccination had been steadily declining for the last ten years, but there had been also a decrease of small-pox as shown in the mortality report, whilst according to the argument of Mr. Humphreys there ought to have been an increase of mortality. With regard to the effect of re-vaccination and the liability to small-pox of nurses and attendants, he believed that in the London hospital ships the nurses had to undergo a probation of a fortnight after re-vaccination; if they had small-pox during that period they would probably enter the hospital as patients and not as nurses. The soldiers of the army afforded a sufficient test of what the result of re-vaccination would be on the population at large. There were 3,953 re-vaccinated soldiers who had had small-pox, and 391 of them had died, in 1860-88, but this fatality of 10 per cent. was about double that of unvaccinated Leicester. It was said that the effects of re-vaccination were proved at Gloucester, but the Gloucester statistics ought to be very carefully examined by the Society. Dr. Bond stated in that wonderful story of his, which was referred to in the paper as exceedingly valuable, that

not one vaccinated child under the age of 10 had died; but that result was obtained by excluding all those children who had been vaccinated within a certain limited period. One child, Elizabeth Sabin, 4 years of age, with six good marks of successful vaccination, caught small-pox three weeks and three days after being vaccinated, and died. Her case was excluded from the list of the vaccinated in Dr. Bond's statistics. Statistics cooked in that way could not be accepted as accurate. He remembered a case in Birmingham where a man named William Wood Warner died of malignant small-pox in eight days, and was classed by the doctor of the hospital as unvaccinated. By the merest chance he found out from the man's widow and sister that the latter had seen him vaccinated. Records based on such statistics were wholly untrustworthy. As to the varying severity of small-pox among vaccinated and unvaccinated, he would point out that at Gloucester these doubtful statistics acknowledged 114 vaccinated deaths. A "mitigated" death was scarcely conceivable. He trusted that the statistics would be taken up by the Society and thoroughly investigated.

Mr. J. Hutchinson, F.R.S., said that as one of the Royal Commission he could not feel otherwise than gratified at the results of an examination of its report by so able a statistician as the author of this paper. So far as he had been able to follow Mr. Humphreys's criticisms, they were in entire support of the conclusions of the commission, and were based indeed upon the facts which it had collected. He felt grateful to Mr. Humphreys for the clear manner in which he had summarised them. He had, however, found some fault with its recommendations. The report signed by the majority of the commission was as clearly and strongly in favour of vaccination as a means of preventing small-pox as Mr. Humphreys himself could wish. No one had any misgivings on that point. The differences of opinion came in when the question arose as to how best to attain that object. It was in reference to this that the author of the paper had charged the majority report with being illogical. He (Mr. Hutchinson) felt it to be a little hard that both Dr. Collins on the one side and Mr. Humphreys on the opposite should bring forward this suggestion of defective logic; nor could he on either hand recognise its justice. The commission by its majority had suggested the best means which their judgment afforded for the promotion of vaccination, and he might add of re-vaccination. Had it been thought that strong compulsory measures would be the best for these objects, probably they would have been recommended. There was no want of logic in believing that other and less direct measures were more likely to secure the end aimed at. There might be an error of judgment as to those measures, but no lack of perception of the value and measuring of the facts upon which the claims of vaccination rested. As regards the measures recommended he would remark that the report must be taken as a whole. It was not fair to take some recommendations and leave aside others. The so-called conscience clause must not be taken without the rest. Speaking

for himself he might say that he believed that the commission's recommendation that the State should remunerate all medical men who did successful vaccinations, was one which was likely to secure a very large increase both of primary and secondary vaccinations. It was indeed the only means which anyone had ventured to suggest for the attainment of the latter object. Yet the re-vaccination of adults was in the light of recently acquired knowledge obviously almost as important as that of infants. No doubt the plan proposed would be to some extent expensive, but the State ought not to flinch on this score from doing what would be for the public good. The profession ought to have a fair inducement offered it to promote by all means in its power the practice of vaccination. Dr. Collins had urged the advantages of isolation, and had spoken as if they were in competition with those of vaccination. There was no such competition, far less any opposition between the two; the advocates of vaccination were at the same time advocates of all practicable methods of isolation. It was surely absurd to argue that because the one was useful the other should be laid aside. Before sitting down he should like, if permitted, to say a few words as to the details of the commission's recommendation that all medical men who vaccinated should receive an honorarium from the public purse, for it appeared to have been misunderstood in some quarters. It had been suggested that it might on the one hand lead to less efficient vaccination, and on the other that it would place the profession, whether willing or not in this matter, under the supervision of the State. The proposal as he understood it was that every medical man who wished to do so should be allowed to claim for a successful vaccination, whether primary or a repetition, an honorarium from the State. No one need so apply who did not desire it, and those who did would certainly be under no hardship when required to allow their patients to be inspected. If anyone did not wish for State inspection he must not claim the State fee. Such fee would of course be wholly without reference to whether the patient had or had not privately paid anything. It would be a bonus paid by the State for the encouragement of vaccination, and it would, it was hoped, induce medical men in private practice to look after their poorer patients with more zeal and see that all were duly vaccinated. It would also be a premium on re-vaccination, now almost wholly neglected except during epidemics. That it would lead to increased care in vaccination and improved methods was, he thought, obvious, for the State would issue its directions and would accord its fee only when they were properly carried out. The gross result would probably be a very large increase of home vaccination and some reduction of that done at stations, and this was precisely what on many and different grounds had seemed to be very desirable. He feared he might have wandered a little from purely statistical matters, but in this would plead that he had only followed the example of the author. He again thanked Mr. Humphreys for the very able manner in which he had put forward the real facts on this most important topic.

Mr. Alfred Milnes regretted that a paper of a partisan character should have been read on a subject which was of the extremest heat in the political world. He thought such a paper justified the misgivings of Lord Overstone when the Society abandoned its ancient motto of *aliis exterendum*. In reference to what Mr. Hutchinson had recommended, he hoped it would be clearly understood that the declaration that the best possible way to extend vaccination was by encouraging the pecuniary interests therein of the whole of the medical profession had been made not by an anti-vaccinationist but by one of the strongest of their opponents upon the Royal Commission. In Table I of the paper, looking at the column of "vaccination postponed by medical certificate," it was remarkable that whilst births had increased by 11 per cent., the postponements had increased by 324 per cent.; and he was delighted to think that their agitation had contributed to this result. It would have been desirable if in the last column the percentages of "children not finally accounted for" had been averaged out in *quinquennia*. He had endeavoured to do so roughly in the few minutes he had, and he found that the default in the first *quinquennium* averaged 4·7, and putting the average small-pox mortality of the *quinquennium* against it he found it was 23·2. Then turning to the *quinquennium* 1887-91 the default in vaccination had risen to an average of 10 per cent., and the mortality had fallen to 15. As the default in vaccination went up, so did the mortality from small-pox go down. If the periods 1872-76 and 1889-93 were compared it would be found that one-third the default meant fourteen times the small-pox. Again, if 1877-81 were compared with 1889-93, there was again in the earlier period one-third the default and more than five times the small-pox. Whilst the percentage of default was being raised through the community, the percentage of small-pox was then being the most strikingly lowered. Turning to Table II he found it was a copy of Dr. Ogle's table, p. 114, without the slightest warning that Dr. Ogle, by the very necessities of the case, stopped at the year 1887, and that these other years had therefore been added in that department which distinctly disclaimed any connection whatever with the question. Consequently they were here dealing not only with the report of the Commission itself, but with extra statistics supplied by the Registrar-General's department, which bore internal evidence that they were different from those presented to the general public, for they were worked out to include chicken-pox all the way down, and therefore differed from the returns of the Registrar-General. In the interpretation attached to Table II the whole conclusion was entirely invalidated. They were asked to compare a mortality of 408 per million in the time before compulsory vaccination with 126 per million in the time after; but the whole matter there depended upon the two great epidemics of 1838 and 1871, one of which was only spread over a period of twelve years, and was therefore to be divided by 12, whilst the last, the 1871 epidemic, the greatest of the century, was spread over forty-two years, and consequently the average was entirely smoothed away. Under these circumstances the conclusion drawn

was entirely erroneous. Then there was the question of the division of the periods by Dr. Ogle which was criticised before the Commission, and Mr. Humphreys said of that criticism that its object was to throw the great epidemic into the compulsory period; but he (Mr. Milnes) might as well say that the object of Dr. Ogle's division was to throw the epidemic out of the compulsory period, and if it came to the insinuation of motives in this way, the insinuation of motive was as legitimate on the one side as the other. The real question was which was the true division? Again and again they were assured in this paper, following Dr. Ogle's statement, that there was no real compulsion before the Act of 1871, but there was abundant evidence that there was complete compulsion before that date. Take, for example, the year 1869 alone. In that one year Samuel Beck, of Dorking, was fined for not having his second child vaccinated, though a former child, injured by vaccination, was produced in court; George Ridley was fined at Bury St. Edmunds for the sixth time; William Johnson, of Leicester, was imprisoned; on 26th August four fines were imposed at Ampthill; on one day, 13th September, 39 summonses were heard at Dewsbury. The great case of Allen *v.* Worthy, which settled the question of repeated penalties, was tried in October, 1869. Out of nine separate imprisonments suffered by Charles W. Nye, five occurred before the passing of this law. In 1869 also Mrs. Sipple, a widow, was imprisoned for fourteen days with hard labour. Did not such cases as these prove that vaccination was compulsory before 1871? He only wished that an opportunity would be afforded of submitting to the Society an elaborate investigation of every figure contained in the paper, but he agreed with Dr. Collins that a question of this sort could not be confined to statistics alone.

Dr. Edward Seaton was very pleased to hear Mr. Hutchinson say that he was entirely in favour of isolation (or rather as he [Dr. Seaton] would put it, *medical sanitary organisation*), such organisation being a very powerful auxiliary to primary vaccination. He need hardly say he was one of those who, with Mr. Humphreys, thought that primary vaccination was absolutely essential. That must be maintained if they wanted to secure a low rate of mortality such as that which now prevailed, and to keep the country generally free from epidemics; but he believed very strongly in the efficacy of medical sanitary organisation as supplementary to vaccination. He thought the government department should do all they could to promote a development of that organisation. He could not say that in the immediate past it had had such facilities for development as it might have had, and he hoped in the future it would be allowed to develop and to assist in preventing those panics which, notwithstanding a good system of vaccination, they knew must from time to time occur from outbreaks of small-pox.

Mrs. Lawrie said, that as a member of the Small-Pox Committee of the Metropolitan Asylums Board, it had been her duty for some

years to see every patient brought on board the hospital ships. In going round these ships, without asking a question, and without looking at the bed card, she could tell by the aspect of the face on the bed whether the patient's case had been modified by vaccination or not. Small-pox modified by vaccination was a very mild complaint. A previous speaker who had described a case of confluent small-pox seemed hardly to know the awful appearance of malignant hæmorrhagic small-pox. The persons suffering from the worst form of the disease were mostly men coming from the port of London, Lascars or foreign seamen. There was something very instructive in this fact: not only had those men never been vaccinated, but in all probability they had not inherited that modified protection which to a certain extent one must believe a number of successful vaccinations in preceding generations produced. It must be remembered that there were often unsuccessful vaccinations which were of no use at all to any human being. Such might arise, without any fault on the part of the operator, from the lymph not being good or not being applied just in the right way; but she defied anybody to show her a case of really hæmorrhagic small-pox within a few years of a successful vaccination. She, as well as being a member of the Metropolitan Asylums Board, was a guardian of the poor, and knew that large numbers of children in Islington, at present amounting to 18 per cent., had never been vaccinated at all. A few months ago there was brought into the hospital ship from West Ham, where the guardians were fully imbued with Dr. Collins's ideas, a poor unvaccinated child, 6 years old, whose father had taken small-pox. His little sister, who had been vaccinated, did not even take the disease at all, but he lost the sight of both eyes, and was living now in hopeless blindness supported by the West Ham guardians. During the last three years they had never had a single case of small-pox amongst the nurses or attendants. It was true that in 1893 there had been a few cases, and the small-pox committee at once inquired for the reason, and found it in the vaccine lymph. There was no such thing as arm to arm vaccination on board the ships, and stored lymph was not so effective as that from arm to arm. Since they had changed the lymph they were again in the old condition of immunity from the disease, and during the last and two previous years there were no instances of small-pox among those employed. The nurses, after being re-vaccinated, were not taken on board for a fortnight, unless there was evidence of previous successful re-vaccination.

The Chairman having then proposed a very cordial vote of thanks to Mr. Humphreys for his paper, and to Mr. J. A. Baines for the clear and able way in which he had read it, which was carried unanimously;—

Mr. J. A. Baines said he would like to add a few words in reply to the vote of thanks. No one regretted more than he did the absence of Mr. Noel Humphreys, since there were questions raised in the paper with which he (the speaker) had but a super-

ficial statistical interest, and he had not otherwise studied the subject. The discussion, however, would be fully reported to Mr. Humphreys, who would no doubt return his answer for publication in the *Journal*. Dr. Collins had pointed out one of the only two statistical points on which he (the speaker) differed a little from the author, and he had previously suggested to the latter, though probably too late, that the value of Table II would be enhanced by the addition of the relative mortality from other diseases at the age-periods in question. He was not suggesting that the alterations in those cases had been as great as in the small-pox rates, but the addition would have formed a wider basis of comparison. The second point was in Table IV, where he thought, with all deference, that Mr. Humphreys had drawn a deduction which was not quite justified by the figures, since the latter did not show that the mortality rate had increased at the later age-periods, but only that by the diminution of the mortality in the earlier periods the incidence on the later of the *total* mortality had been made to appear higher.

The following comments by Mr. Humphreys on the discussion that took place after the reading of his paper have subsequently been received by the Editor:—

As illness prevented my presence at the meeting of the Society at which my paper was read, I have, in accordance with precedent, the sanction of the Council of the Society to make a few comments upon the discussion which followed the reading of the paper. I have, in the first place, to express my regret at my omission to notice the marginal reference on p. 171 of the Final Report of the Commission to the source of the figures, respecting the small-pox epidemic in Marseilles in 1828, quoted by Dr. Collins and Mr. Picton in their "Dissent from the Report." Having since referred to the source of this quotation, I cannot conceal my astonishment that Dr. Collins and Mr. Picton should have noted in such a document that "2,000 vaccinated persons caught the disease" during this epidemic, without also noting that 4,000 unvaccinated persons were also attacked, and that while the 2,000 vaccinated cases yielded only 20 deaths, or 1 per cent., 1,000 of the 4,000 unvaccinated cases, or 25 per cent., proved fatal. Then Dr. Collins in his remarks seems still to insist that the increasing proportion of vaccinated cases of small-pox treated in hospital in recent years due, of course, to the more general adoption of infant vaccination, affords evidence that the protective effect of vaccination approximates to *nil*. Dr. Collins in his remarks, as in his "Dissent Report," persistently ignores the obvious protection conferred by vaccination upon children, as proved by the remarkable change in the age-incidence of fatal small-pox since vaccination was made compulsory in England. It is true that in the "Dissent Report," attempts are made to explain this changed incidence in some other way, which are summed up in the following words: "That vaccination cannot be accepted as an adequate explanation of the shifting of age-incidence of fatal small-pox, or at any rate as the sole explanation, is proved by the

fact that a very considerable shifting of age has been observed in the case of deaths from small-pox of those certified to have been unvaccinated." As if the age-incidence of fatal small-pox among the unvaccinated did not mainly depend upon the ages of the unvaccinated population! Then again Dr. Collins still harps upon the asserted shifting of age-incidence in other diseases of a similar character, although it was proved to the satisfaction of the Commissioners (excepting apparently himself and Mr. Picton) that no similar shifting of age-incidence had taken place.

In face of the existence of this "Dissent Report" of Dr. Collins and Mr. Picton, it is somewhat surprising to find General Phelps deploring that "the Commission was unfortunate in one respect, that there was not a single anti-vaccinist upon it;" and it would be interesting to know what he meant by his assertion that "Leicester, by giving up vaccination, and adopting sanitation instead, had enormously decreased the children's death-rate." As Mr. Alfred Milnes has undertaken to prepare a paper on vaccination and small-pox, and to deal with the available statistics on the subject from the standpoint of the opponents of vaccination, I will only venture to hope that he will in his paper produce some justification for the assertion in his remarks that, "as default in vaccination went up, so did the mortality from small-pox go down." Does he intend to urge that vaccination is not only useless, but that it produces small-pox? It is desirable, moreover, with regard to the statistics in my paper referred to by Mr. Milnes, to state that they were all derived either from the Commissioners' Report, or from the published Reports of the Registrar-General. As the discussion that will follow the reading of Mr. Milnes's paper will afford further opportunity for criticising the statistical arguments of the opponents of vaccination, it only seems further necessary here to express my appreciation of the generous terms in which my paper was referred to by several of those who took part in the discussion.

Statistics *of* Small-Pox *and* Vaccination, *with special* Reference *to* Age-Incidence, Sex-Incidence, *and* Sanitation. *By* Alfred Milnes, M.A. (Lond.).

[Read before the Royal Statistical Society, 15th June, 1897.
A. E. Bateman, Esq., C.M.G., President, in the Chair.]

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I.—*Preliminary Observations.*

Being of those who hold to what may be regarded as the earlier faith of the Statistical Society, that the true function of the statistician is simply to collect facts as fully and marshal them as clearly as possible, wholly regardless of what the practical tendencies of such facts may be, it is with some little reluctance that I venture to draw the further attention of the Society to a question hotly debated in the arena of practical politics. Amongst the disadvantages of State interference and State regulation in matters which should be of purely individual concern, not the least is the engendering of so much heat that the single-minded pursuit of light becomes difficult to the verge of impossibility. This has been the case to a peculiar extent in respect of what is known as "The Vaccination Question," where a law, harshly administered and stubbornly resisted, has on both sides tended to overlay with special pleading what should have been a purely scientific investigation.

Whoever would understand the political phenomenon known as "The Anti-Vaccination Agitation"—and its magnitude would seem to indicate it as being at least worth understanding—must remember some one or two facts, facts obvious enough indeed, but constantly forgotten. And chief amongst them this, that every

opponent of the practice, every sceptic, without exception, as to its benefits, has in the first instance approached the question in a spirit at least of impartiality, and probably with all his prejudices strongly in its favour. Every man who approaches the question for the first time finds a considerable body of authority committed to one side of the controversy; and in controversy authority rarely fails to command as much weight as it deserves, while in controversies as to matters of health it has commanded as a rule much more. The qualifications of the investigators of this question will of course be as various as is the case with every other question of politics. Some, like Professor Crookshank and Dr. Creighton, have addressed themselves to the task in happy possession of every mental instrument that faculty and attainment could provide. But, be their equipment for the discussion great or small, all dissentients from the orthodox vaccine faith, down to the humblest, have at least this in common, that they conceive themselves to have arrived, by a route of perfectly impartial and disinterested investigation, at conclusions justified by reasoning sufficient to themselves. But secondly, it must be also remembered that in the presence of a compulsory law it is not possible, nor is it pretended, that this impartial attitude of mind could persist. When once the conduct, which is founded on and gives expression to such conclusions, is treated as criminal and visited with penalties, society has declared a war which substitutes struggle for investigation, and the stage of impartiality is past. Such a thought-history at least it is but bare justice to claim for myself. When, now nearly thirty years ago, my attention was first called to vaccination as a theory, I was unaware that it had been challenged, and supposed the benefits of the practice to have been established in the same sense as the circulation of the blood, or any other scientific fact. Not merely in absolute impartiality, but slowly and unwillingly, I arrived at my conclusion—and took the consequences. Of my competence for forming that conclusion those must judge who, being themselves competent, will do me the honour to read this paper "not to contradict and confute, " nor to believe and take for granted, nor to find talk and dis- " course, but to weigh and consider." I only submit that it is no fault of mine if I seem to be pleading a cause where I ought to be, and gladly would be, investigating a problem.

II.—*The Logical Position.*

If statistical investigation is to be used with a view to the support of a legislative enactment, it is obviously of the utmost importance that the logical characters of the argument should be

clearly apprehended. In the present position of the law the question may be regarded as presenting itself somewhat thus:—

Is vaccination a proven preventive of small-pox or of death by small-pox; and, on the issue so stated, does the evidence in its favour attain to so high a probability as to acquire that character of practical certainty whereby alone compulsory provisions can be justified?"

In the paper on "Two Hundred and Fifty Years of Small-Pox "in London" read by Dr. Guy before this Society in 1882, I find it written that to the vaccination question "There is, there can be, "no answer save such as is couched in the language of figures." I trust it is no great disloyalty to the principles of this Society to demur to such wholesale appropriation, and to protest that so many-sided a question can hardly be settled offhand by any single and isolated set of considerations. For such treatment implies that we start upon a question without having troubled ourselves to inquire either its nature, its limits, or the true conditions of its solution. It must never be forgotten that if the benefits of vaccination are as alleged, then we are confronted with a phenomenon absolutely unique. In no other case is it proposed or pretended by the inoculation of one disease to prevent another. We have then to seek for and estimate the evidence for a fact which, if true, is quite without a parallel. And this dominant feature of the case needs to be kept in view at every step in the investigation. So that, for the practical statistician who really wishes to arrive at the truth of the matter, the question as stated above will require modification, and will take some such form as:—

"Can statistical evidence in favour of the claims of vaccina-"tion be found of weight enough, and of a sufficiently unassailable "credibility, to override the inherent pathological improbability "of those claims?"

The method of this, as of most other statistical investigations, will be of course that known to logicians as concomitant variations. Since the labours of the late Professor Jevons, it has been a mere commonplace of logic that this method can never carry us beyond the region of probable argument. So that we have to ask whether we can accumulate sufficient statistical probabilities on the one side to counterbalance the underlying pathological improbability on the other.

And in the course of the search one precaution, too often neglected, should never be forgotten,—a vigilant application of the check by the method of the "control experiment." The subject matter of our investigation is vaccination and small-pox. If then we would avoid fallacy we are bound, whenever a change pertinent to our investigation occurs in the presence of vaccination, to

re-investigate with a view to discover whether the same change may not equally occur in its absence; and, whenever a change occurs in small-pox which seems to bear on the argument, to re-investigate so as to know how far the same change has occurred in other diseases of like kind, but to which no vaccinal methods have been applied. The neglect of this precaution in questions unconnected with any legal enactment is reprehensible enough, as a disloyalty to the cause of scientific truth; but to neglect it when arguing for the maintenance of penal statutes directed against men and women of blameless life, against whose character "mistaken," "misguided," and "ill-informed" are the worst epithets that even Mr. Noel Humphreys can suggest, is a direct contribution to the worst form of anarchy.

In the question with which we have to deal, the basis of comparison, with a view to establishing the concomitant variations, if any, will be fourfold—Time, Place, Age, and Sex.

It thus becomes clear that the proper periods for comparison will have to be ascertained, and this in its turn involves a knowledge of the history of past enactments and of their effects in respect of the vaccination of the people. A short sketch of these is the more necessary, as I believe that history to have been, as a rule, radically wrongly stated.

III.—*Vaccination Legislation.*

Before the year 1853 vaccination legislation has but one feature worthy of special remark. In the year 1840 was passed "An Act to Extend the Practice of Vaccination," and by this Act small-pox inoculation was made a penal offence. Now small-pox inoculation in this country dates, in its modern form, from 1721. Wherefore, rightly or wrongly, Parliament by this Act deliberately pronounced the medical profession guilty of a life-destroying error which had lasted for a hundred and twenty years. So that when in 1867 the edifice of legal compulsion of vaccination was completed by the passing of a measure in which this prohibition was again repeated, we have infallibility proclaimed and error admitted in one and the same parliamentary breath. It must never be forgotten that vaccination is not the first but the second method of small-pox prevention advocated by a practically unanimous profession; that the first of these is now a penal offence; and that some modesty of tone might well befit the advocacy of the compulsory enforcement of the second remedy by a profession which has thus admittedly indulged for more than a solid century in deadly error as to the first. Yet it is the first

thus penalised, and not the second at all, which presents analogy with the modern methods of treatment by "attenuated virus."

The first law for the compulsory infliction of vaccination was Lord Lyttelton's Act in 1853. Judged by its results upon the official figures, this would seem to have been the most effective of all the series of vaccination Acts. Complete records of the percentage of vaccinations to births are wanting, but the vaccinations "at the expense of the poor rates" which had amounted to 66·0 and 61·0 per cent. of the births in 1852 and 1853 respectively, rose to no less than 108·7 in 1854. And so far as statistics can bear on the justification of the maintenance of compulsion, the question will be as to how far the statistical results have verified the promises by which the compulsory enactment was originally obtained. As to the promises themselves, there can happily be no dispute. In moving the second reading of the "Vaccination "Extension Bill" on 12th April, 1853, Lord Lyttelton himself said, "It is unnecessary for me to speak of the certainty of "vaccination as a preventive of small-pox, that being a point "on which the whole medical profession have arrived at complete "unanimity." And in thus formulating *the promise which passed the law*, Lord Lyttelton did but echo the collective voice of the Epidemiological Society, which in its report on small-pox and vaccination, 1853, had written, "We are ourselves satisfied, and it "is the concurrent and unanimous testimony of nearly 2,000 "medical men with whom we have been in correspondence, that "vaccination is a perfectly safe and efficient prophylactic against "this disease." And in its turn the Epidemiological Society merely brought up to date the declaration to which, as early as 1800, John Ring, in that "Testimonial" to which he had secured the signature of nearly every London doctor, had proclaimed it "our opinion that those persons who have had the cow-pox are "perfectly secure from the future infection of the small-pox." Nor has the enormous mass of accumulated post-vaccinal small-pox down to our own day sufficed to diminish the arrogance, though it has somewhat changed the terms, of those official assurances which originally procured, and still maintain, the compulsory law. In 1881 the "Times" declared that so protective were vaccination and re-vaccination that "no one need have small-"pox unless he or she pleases." And the "Lancet," on 16th January, 1892, wrote in a leading article, "No one need die of "small-pox; indeed no one need have it unless he likes—that is to "say, he can be absolutely protected by vaccination, once "repeated." And Mr. Ernest Hart, editor of the "British "Medical Journal," wrote in the "Times" of 31st August, 1894, an assertion which though limited to the earlier ages of life, is as

uncompromising as any of its predecessors; "Vaccinated children "under 10 years of age are wholly and entirely immune from "small-pox and cannot be infected." Nor has the possibility of there being a debtor side to the account been forgotten. The denial of drawbacks has been neither less positive nor less emphatic than the assertion of benefits. "Against this vast "gain," writes Sir John Simon, "there is no loss to count." Such then were and are the promises and professions by which the compulsory law was obtained and is still maintained; and therefore, in an attempt to estimate statistically the merits of that law, it is with these promises and professions that the actual statistical facts must at every step be confronted, compared, and contrasted.

The next landmark in the history of vaccinal legislation is the law of 1867, and this is to this day the law under which all penalties are exacted against unbelievers. This is *the* vaccination law of England; yet vaccinists almost invariably ignore it as far as possible in favour of an Act, emendatory in details of administration and registration, passed in 1871; the real object being apparently to throw the year 1871, with its remarkable and fatal small-pox epidemic, into the earlier period of compulsion not efficiently enforced. It thus becomes of the utmost importance to determine, as a matter of simple historical fact, how vaccination was enforced under the 1867 Act, and before that of 1871 took effect in 1872. Fortunately evidence abounds of the uncompromising severity with which the law of 1867 was at once put in force. The 1871 Committee reports itself "glad to find that "wherever the guardians endeavour to carry out the law, it is "very generally, and indeed almost universally enforced." And if, as is often the case, the question is made to turn on the appointment of vaccination officers, the same Committee can be cited as reporting that "it appears that in the majority of the unions "such officers have been appointed." I will only cite a few of the results. In one of the years in dispute, the year 1869, Samuel Beck of Dorking was fined for a second child, though he produced in court as his "reasonable excuse" a first child injured by vaccination. In September George Riley, of Bury St. Edmunds, was fined for the sixth time—a treatment already six times as severe as the late Royal Commission would sanction. In this year William Johnson of Leicester was imprisoned—the well known "silver watch case" of Dr. Seaton. On one day of this year, 26th August, four fines were imposed at Ampthill with alternative imprisonment up to two months. On one other day, 13th September, thirty-nine summonses were heard in Dewsbury. That no element of reckless harshness might be wanting, a fine was

imposed at the Thames Police Court in spite of the production of a medical certificate of unfitness. In August Mrs. Anne Sipple was committed for seven days' hard labour—an illegal sentence—and confined in a stone cell with an infant of eighteen months, the child deprived of shoes and socks, and a diet of bread and water only for both. In November of the same year the leading case of Allen *v.* Worthy had decided an appeal in favour of the legality of those endlessly repeated prosecutions, which have been now unanimously condemned by the Commission in that Interim Report, which Mr. Noel Humphreys and other pro-vaccinist writers so studiously ignore. And before the passing of the 1871 Act, C. W. Nye of Chatham had served five out of the nine separate imprisonments which he underwent in vindication of vaccine law. This man Nye was a watch maker, with hands rendered delicate by his calling; and in prison he was set to wheeling stones for the repair of the building, until, to quote his own words, "the handles of every barrow that I wheeled were "stained with my blood." The object seems to have been to deprive him of a livelihood by crippling him in the exercise of his trade; but be that as it may, all such "criminal" treatment of anti-vaccinists has been unanimously condemned by the Commission. So that those who hold that vaccination was "not efficiently "enforced" before 1871, may at least console themselves with the assurance that never more in our history will it be *so* efficiently enforced as it was then. And the oft repeated statement that "no effectual means of enforcing the obligation existed until after "the Act of 1871 took effect," is quite curiously the reverse of the truth.

That these facts are by no means recited for the mere sake of re-opening old wounds, that they are on the contrary of the utmost importance in the search for statistical truth on the question, is at once manifest, when we introduce the correction which they indicate into the table presented to the Commission by Dr. Ogle, and printed on p. 114 of its First Report. The age-distribution of the population not being given for successive years in the Registrar-General's Reports, I confine myself to the "all "ages" column of the table in question for pointing the following contrast:—

TABLE I.—*Mean Annual Rate of Mortality per Million from Small-Pox at all Ages in Three Groups of Years, selected with reference to Optional and Obligatory Vaccination.*

Dr. Ogle's Division.				The Historical Division.	
Period.	Mortality.	Period Difference.		Mortality.	Period.
(1.) Vaccination optional, 1847-53	305	82, or 26·8%	117, or 38·8%	305	(1.) Vaccination optional, 1847-53
(2.) Vaccination obligatory, but not efficiently enforced, 1854-71...	223	109, or 48·8%	39, or 20·7%	188	(2.) Vaccination obligatory, but not efficiently enforced, 1854-67
(3.) Vaccination obligatory, but more efficiently enforced by vaccination officers, 1872-87.....	114			149	(3.) Vaccination obligatory, but more efficiently enforced by vaccination officers, 1868-87

If the object were to show how different arrangements of the same figures will elicit from those figures an entirely opposite evidence, a better instance than this table could hardly be found. According to Dr. Ogle, small-pox during a period of vaccination but slightly obligatory declines by little more than a quarter; whilst real stringency further diminishes the remainder by nearly one-half. But in the light of the historical facts above cited we see that the decline during the period of little stringency approached to 40 per cent., whilst the fullest severity of vaccinal enforcement coincided in time with a further reduction of little more than 20 per cent. According to Dr. Ogle's division, the small-pox reduction during the second period approaches the double of that in the first; according to the historical division, that of the first approaches the double of that in the second.

IV.—*Statistics of Vaccination and Small-Pox.*

Having thus it is hoped settled the proper points of chronological division, it becomes necessary to confront the statistics of vaccination with those of small-pox, with a view to estimating their concomitance, if any. This we can do in—

TABLE II.—*Statistics of Primary Vaccination of Infants,* 1872-93, *from the Annual Reports of the Local Government Board; and of Small-Pox Deaths per Million, from the Annual Reports of the Registrar-General. Fatal Chicken-Pox included under Small-Pox.*

1	2	3	4	5	6	7	8	9
Year.	Births Registered during Year.	Of the Children whose Births were Registered during the Year given in Col. 1, by the 31st January in the Year next but one following there were					Quinquennial Average of Default.	Quinquennial Average of Small-Pox Mortality per Million.
		Successfully Vaccinated.	Certified as insusceptible of Vaccination; had Small-Pox; or Died Unvaccinated.	Vaccination postponed by Medical Certificate.	Remaining.	Percentage of Children not finally accounted for (including cases postponed).		
1872....	821,856	698,137	81,192	42,527		5·1		
'73....	826,508	704,666	81,540	4,264	36,038	4·8		
'74....	854,787	727,065	86,341	5,677	35,704	4·8	4·7	232
'75....	850,354	722,466	87,549	5,914	34,425	4·7		
'76....	887,694	763,277	85,885	5,528	33,004	4·3		
'77....	887,947	766,824	80,541	6,681	33,901	4·5		
'78....	891,743	760,982	88,820	6,475	35,466	4·7		
'79....	880,222	756,835	78,246	6,670	37,471	5·0	4·7	86
'80....	881,652	750,203	88,266	5,930	37,253	4·9		
'81....	883,744	765,162	78,569	6,302	33,711	4·5		
'82....	889,082	763,525	82,536	7,598	35,423	4·8		
'83....	890,780	762,080	83,060	8,110	37,440	5·1		
'84....	906,581	764,975	91,578	8,693	41,335	5·5	5·5	60
'85....	894,263	757,714	85,006	9,323	42,220	5·8		
'86....	903,846	754,059	92,072	10,187	47,528	6·4		
'87....	886,198	733,980	89,410	10,402	52,406	7·1		
'88....	879,813	719,103	85,187	12,282	62,701	8·5		
'89....	885,909	707,161	90,755	13,366	74,627	9·9	10·0	15
'90....	875,188	682,560	93,442	13,615	85,571	11·3		
'91....	914,079	693,117	98,166	13,823	108,973	13·4	13·1	17
'92....	890,695	663,657	94,499	13,278	119,261	14·9		
'93....	914,557	661,513	105,875	13,845	133,324	16·1		

This table introduces us to the question at a time when vaccination is at its high-water mark, when less than 5 per cent. of the children born escaped the performance of the vaccine rite. Incidentally this fact in itself is worth a moment's consideration, just to compare it with the first of the Local Government Board's "Instructions to Vaccinators under Contract," which opens with the injunction, "Vaccinate only subjects who are in good health." If this instruction has been loyally obeyed, and if at the same time the figures are correct, then of the $8\frac{1}{2}$ millions of children born between 1872 and 1881, we have it that, of those surviving, more than 95 per cent. passed through the first months of infancy "in good health;" in fact, that less than 5 babies in 100 have

anything the matter with them. Figures can indeed prove anything to the man whom they can convince of that. The fact of the matter of course is that the Local Government Board is year by year publishing, and what is worse approving, figures which bear witness to the utter disregard of the regulations which they themselves profess to put forward as a protection for the puny and ailing amongst the children of the nation. Here however there are consolations; and while I most earnestly lament the suffering and sorrow which lie behind these figures, I cannot but remember that they bear solid testimony to the real existence of that particular form of reckless maladministration, which more than anything else has revolted the feelings of the people.

But in even this respect the table bears witness to improvement, and shows that the labours of the anti-vaccinist party have not been thrown away. Col. 5 shows an increase in postponements of vaccination by medical certificate from 4,264 in 1873 to 13,845 in 1893, a ratio increase of 324 per cent., while births have only increased by 11 per cent. We have been educating our masters; and even medical men are less willing than they used to be to vaccinate any child under any conditions.

More important is the evidence afforded by this table as to the entire absence of quantitative concomitance as between the thorough vaccination of a population and the immunity of that population from small-pox. As the quinquennial average of vaccination default goes up, small-pox continues to go down. Comparing 1872-76 with 1887-91, we have it that when there was less than half the vaccination default there was more than fifteen times the small-pox mortality. Or, comparing the actually first with the actually last quinquennium in the table, 1872-76 with 1889-93, we find nearly four times the vaccination default accompanied by only one-thirteenth of the small-pox mortality. It is hardly necessary to go beyond the evidence of this table to show that some cause at once more pertinent and more potent than vaccination must have been at work to produce the striking fall in small-pox which set in about the year 1886. Vaccination and small-pox attained their maximum together, and together they have steadily declined.

For more detailed evidence as to the behaviour of small-pox during registration times, we may consult the following table :—

TABLE III.—*Annual Rate of Mortality per Million Living from Small-Pox in England and Wales. Fatal Chicken-Pox included in Small-Pox.*

[From 1838—1887 the figures are taken from Dr. Ogle's Table A, "Royal Vaccination Commission, First Report," p. 114.]

Year.	Mortality.	Year.	Mortality	Year.	Mortality.	Year.	Mortality	Mortality, omitting Chicken-Pox.
1838....	1,064	1852 ..	401	1867....	116	1881....	124	119
'39....	589	'53....	171	'68....	93	'82....	54	50
		'54....	151	'69....	70	'83....	39	36
1840....	661	'55...	134			'84...	87	83
'41....	400	'56....	119	1870....	116	'85....	107	104
'42....	168	'57...	204	'71....	1,015	'86....	13	10
'43....	?	'58...	332	'72....	824	'87....	21	18
'44....	?	'59....	195	'73....	101	'88....	40	36
'45....	?			'74....	91	'89....	4	1
'46....	?	1860....	138	'75....	40			
'47....	246	'61....	66	'76....	103	1890....	4	1
'48....	397	'62....	80	'77....	178	'91....	5	2
'49....	264	'63....	289	'78....	79	'92....	19	15
		'64....	367	'79....	25	'93...	53	49
1850....	262	'65....	303			'94....	31	27
'51....	389	'66....	141	1880....	29	'95....	10	7

This table, without the last column, has recently been described as "Dr. Ogle's table, 'First Report,' p. 114." But in one important particular the description is inaccurate, as Dr. Ogle's table necessarily stops at 1887, and thus fails to contain what is probably its most instructive portion, the immense fall in small-pox during the last ten years, concurrently, as we have seen, with a great revolt against vaccination. Much ingenious sophistry has been brought to bear on this table with a view to show that compulsory vaccination has been causally connected with the change. The twelve years 1838-42 and 1847-53 have been taken as one member of the comparison, and the forty-two years 1854-95 as the other. The illogical character of this procedure becomes more specially manifest when we remember that small-pox is essentially an epidemic disease, and that by this method of treatment the great epidemic of pre-compulsion times is averaged over only twelve years, whilst the remarkable and fatal epidemic of 1871-72, when compulsory vaccination was at its height, is diluted out amongst forty-two. It is easy thus to arrive at an average per million rate of 408 for the first period and 126 for the second. But the real question is, what can epidemic small-pox do in the presence and absence respectively of fully enforced compulsory vaccination? To answer the question thus put we may compare two quinquennia, the one under voluntary the other under compulsory vaccination, and each commencing with an epidemic. Such will be the quinquennia 1838-42 and 1871-75,

whereof the respective averages will be found to be 576 for 1838-42, and 414 for 1871-75, a diminution of 26 per cent. Now this, so far as it goes, is a genuine diminution, and the vaccinist may endeavour to claim it to the credit of his nostrum. But the claim will be at once disallowed when we apply the method above alluded to of the "control experiment." To render the change attributable to vaccination, and to vaccination only, it must be unique, and no other fairly comparable disease must show on similar comparison a like diminution. The condition is at once seen to be unfulfilled when we apply the test to the fevers—typhus, typhoid, and simple and ill-defined. In 1838-42 these give an average per million mortality of 1,053, and for 1871-75 the similar average is 595, a diminution of 43 per cent. There is no evidence that vaccination is an indispensable antecedent to a small-pox change when the same change to a much greater extent occurs with the fevers wherein no vaccinal influence is claimed. The comparison can be more fully set forth thus :—

TABLE IV.—*Mortality compared, Small-Pox with the Fever Group (Typhus, Typhoid, and Simple and Ill-defined), for the Two Quinquennia* 1838-42 *and* 1871-75.

	1838-42.	1871-75.	Diminution Per Cent.
Small-pox	576	414	26·4
Fever	1,053	575	43·4

If it be objected that this is to compare two epidemics of an essentially epidemic disease on the one hand with two periods of diseases of a more endemic character on the other hand, I might be content to reply that such fault in the comparison ought to favour vaccination if that alleged prophylactic were of real value ; for on such a supposition small-pox epidemics should have ceased, or should at least have shrivelled to the proportions obtainable from an incidence exclusively upon the unvaccinated residuum. But if it be desired to compare the various periods of a disease of specially epidemic character, we may obtain the desired comparison in respect of cholera. Now in the first decade of the resumption of registration, 1847-56, the annual average of cholera mortality per million was 478 ; in the last decade 1885-94 it was 16. And this comparison can be carried further.

From the figures of Table III above there has been derived the statement that " During the twelve years 1838-42 and 1847-53, " for which official records exist, prior to vaccination being made " compulsory, the average death-rate from small-pox averaged " 408 per million. . . . . During the forty-two years of

"compulsory vaccination the annual death-rate from small-pox "averaged 126 per million . . . . showing an average decline of "more than two-thirds, or 69 per cent." In this statement the reasoning is suggested rather than set out, and it amounts to an implication that since the decline of small-pox followed, it was therefore caused by, the enactment of compulsory vaccination; and the form of this implied reasoning is that known technically as *post ergo propter.* To this apply once more the "control" observation, as thus—

TABLE V.—*Mortality of Small-Pox and Cholera compared, on Average per Million, for the Twelve Years* 1838-42 *and* 1847-53, *and the Forty-two Years* 1854-95.

	1838-42 end 1847-53 (Twelve Years).	1854-95 Forty-two Years).	Decline per Cent.
Small-Pox	408	126	69
Cholera	320	69	78

It is not contended, so far as I am aware, that it was vaccination which caused the decline in cholera; yet the same statistical treatment must equally fail or equally succeed in attributing the decline of both diseases to the same agency. For a conclusion which is held to be established by a percentage of 69, surely becomes yet more certain when the percentage rises to 78.

It thus becomes clear that we have no need to intract a special cause, vaccination, to account for a course of behaviour in small-pox which is not special to that disease.

Nor can the vaccinist derive comfort from further and more minute examination of the returns of small-pox. So far as primary vaccination is concerned the case as against epidemic small-pox is abandoned by the sincerest friends of vaccination themselves. "Primary vaccination," admits Dr. Gayton, "is a very fleeting "protection indeed" (Commission, *Q.* 1755); "it is not absolutely "protective up to any age" (*idem*, 1768); "it would not ward off "an epidemic" (*idem*, 1770). Nor is this a conclusion recently arrived at; on the contrary, though suppressed for political purposes, it has been well known from the beginning. As the reference has been challenged, it may be as well to place it on record that it is no less an authority than Sir John Simon himself in whose "Papers" we read of 2,000 cases of post vaccinal small-pox occurring in Marseilles as early as 1828, a quarter of a century before Lord Lyttelton described vaccination to the House of Commons as a certain preventive, and by that promise won the law. Of course the law when won did not stop the epidemics.

Three times since the passing of that Act have we gone through periods which may fairly be described as "epidemics," thus:—

TABLE VI.—*Epidemics of Small-Pox.*

Date.	Deaths from Small-Pox.
1857–59	14,244
'63–65	20,059
'70–72	44,840

	Percentage Increase of	
	Population.	Small-Pox Deaths.
Between 1st and 2nd epidemics	7	40·8
„ 2nd „ 3rd „	9	123·0

And as year by year, up to about 1886, the population was becoming more and more thoroughly vaccinated, so the percentage of vaccinated patients to total patients continued to increase. In § 80 of the Dissentient Report of the Commission it is recorded of the London Small-Pox Hospital, that "the percentage of cases "of vaccinated small-pox patients to the total admissions has "progressively increased with the increase of vaccination among "the general population, if not in an exact ratio at any rate in a "ratio approximating closely to it." And this position is enforced in the following table:—

TABLE VII.

["Dissentient Report," p. 173.]

Years.	Post-vaccinal Small-Pox per Cent. of Total.	Years.	Post-vaccinal Small-Pox per Cent. of Total.
1826	38	1864	84
'35–45	44	'78–79	93
'45–55	64	'85	93
'55–65	78	'88–91 (14 cases only)	100
'63	83		

So far as I am aware no claim has ever been set up that more that 90 per cent. of London is vaccinated. Yet more than 90 per cent. of London small-pox is admittedly vaccinated, so far as the small-pox hospitals give evidence. In which connection the common plea that it is only the severer cases that go to hospitals acquires, so far as it is truly urged, a significance unexpected by vaccinists. In the 1871 epidemic 91·5 per cent. of the cases admitted to the Highgate hospital had been vaccinated, and 96 per cent. in 1881. If of the population outside the hospital not more than 90 in 100 are vaccinated, while of the patients inside the hospital the vaccinated percentage is 96, the protective

influence of vaccination remains to seek. The teaching of these figures, moreover, becomes more and more emphatic as small-pox declines to such small limits as to permit of more minute knowledge of its details. For instance in the Metropolitan Asylums Board hospital ships in 1890, the returns were—

	Cases.	Deaths.
Unvaccinated	5	—
Vaccinated	19*	1
Re-vaccinated	2	2
Total	26	3

* One of these was certainly not small-pox, and three others were doubtful.

The vaccinal condition of the London population can never be of more than speculative ascertainment. The best estimate I can frame does not admit of more than 80 per cent. as vaccinated, taking the average for the last ten years. And in this experience at the hospital ships it will be observed that, small as are the numbers, they follow the law of probability very closely, with 80·8 per cent. of the total cases vaccinated. The incidence of the mortality in this small, but therefore highly ascertainable, group of cases is worthy of notice, as bearing on another aspect of the question.

So much for the comparison on a time basis—the concomitance is conspicuous by its absence.

Nor is comparison by place any better. The whole civilized world sends witnesses to failure. The British Army in India, without exception vaccinated as adults and in vast majority re-vaccinated, yet yields the following return :—

TABLE VII.—*Small-Pox amongst European Troops in India.*

Years.	Cases.	Deaths.
1880	17	4
'81	17	1
'82	44	4
'83	105	9
'84	78	8
'85	12	0
'86	22	1
'87	40	2
'88	111	10
'89	153	17
'90	36	4
'91	14	1
'92	18	3
'93	33	4
'94	13	3
Total	713	71

Here are men in the prime of life, all of them recently vaccinated, and most, if not all of them recently re-vaccinated, yet 713 of them take the disease whereof they have been warranted by Sir John Simon "able to betray no remnant of susceptibility "to infection;" and their fatality rate is just about twice as great as that recorded in the recent outbreak in unvaccinated Leicester Again, our Army in Egypt gives the following particulars:—

TABLE VIII.—*Small-Pox in the Army in Egypt.*

Year.	Strength.	Admissions.	Deaths.	Ratio per 1,000.	
				Admissions.	Deaths.
1882 ...	6,198	3	—	0·5	—
'83	7,897	8	3	1·0	0·37
'84	6,468	25	1	3·8	0·15
'85	9,593	52	4	5·4	0·42
'86	11,062	51	3	4·6	0·27
'87	5,272	26	4	4·9	0·76
'88	3,346	14	4	4·2	1·19
'89	3,431	42	6	12·2	1·75

These men are all re-vaccinated, and all presumably healthy young adults. Yet we read in the Army Medical Report for 1889 that the figures above quoted for that year were obtained, "not "withstanding all the precautions taken in Cairo, and due regard "having been paid to vaccination and re-vaccination." We have here a death-rate of no less than 1,750 per million, or nearly 73 per cent. higher than the general English mortality in that remarkable and fatal small-pox epidemic of 1871, to which so much ingenious sophistry has been devoted in the endeavour to put it back into precompulsory times. But I have not heard of any attempt to put back the British Army of 1889 into times when "there was no effectual means of enforcing the obligation."

Other armies have the same tale to tell. There is no dispute in any quarter that re-vaccination on joining the colours has been the law for the German army (Prussian army before 1871) since 16th June, 1834. Now in the "Times" of 17th September, 1896, Lord Lister, President of the Royal Society, speaking at the annual meeting of the British Association, is reported to have said that small-pox "is absolutely unknown in the huge German army

"in consequence of the rule that every soldier is re-vaccinated on entering the service." The facts are thus—

TABLE IX.—*Small-Pox in the German Army*, 1834-87.

Year.	Cases.	Deaths.	Year.	Cases.	Deaths.	Year.	Cases.	Deaths.
1835.....	259	5	Forward	1,809	48	Forward....	3,187	77
'36.....	130	9	1853 ...	138	1	1870–71†	2,879	164
'37.....	94	3	'54	121	3	'71‡.....	828	34
'38.....	111	7	'55	12	—	'72	389	12
'39.....	89	2	'56	21	—	'73§	26	2
			'57	35	1	'73–74‖	22	1
1840.....	74	2	'58	64	—	'74–75....	26	—
'41.....	59	3	'59	58	2	'75–76....	20	—
'42.....	99	2	1860	44	3	'76–77....	19	—
'43	167	3	'61	56	4	'77–78...	12	—
'44.....	69	3	'62	25	1	'78–79....	15	—
'45.....	30	1	'63	90	—	'79–80....	7	—
'46.....	30	1	'64	120	1			
'47.....	5	—	'65	69	1	1880–81....	23	—
'48.....	22	1	'66	91	8	'81–82....	16	—
'49.....	62	1	'67	188	2	'82–83....	9	—
			'68	97	1	'83–84....	7	—
1850.....	176	1	'69	138	1	'84–85....	7	1¶
'51.....	246	3				'85–86 ..	6	—
'52.....	87	1	1870*....	41	—	'86–87....	7	—
Forward	1,809	48	Forward	3,187	77	Total	7,505	291

* January to June, 1870.
† July, 1870, to June, 1871.
‡ July to December, 1871.
§ January to March, 1873.
‖ 1st April, 1873, to 31st March, 1874.
¶ Unsuccessfully re-vaccinated on joining the colours.

In reply to a correction of this error published by Mr. Trobridge, F.S.S., Lord Lister has said that his statement would have been perfectly accurate if he had confined it to *fatal* small-pox. The table shows that the statement as amended would still have been wrong to the extent of nearly 300 deaths. But its evidence of the failure of the severest form of vaccination (ten insertions in each arm) is of more importance than its bearing on the statements of any one man, however deservedly eminent.

The above Table IX is taken from pp. 23 and 24 of the official *Beiträge zur Beurtheilung des Nutzens der Schutzpockenimpfung*, published in Berlin in 1888, and written, it is needless to state, in defence of vaccination. This work is particularly valuable for the full information it contains as to the vaccinal condition of German small-pox patients. I do not propose to enter here on the question of the German law of vaccination and re-vaccination, and the true date at which the enforcement of vaccination in Germany commenced. I content myself with recording my opinion that the ingenuity of sophistry has been vainly strained in the endeavour

to explain away the provisions of the German law of 1835 and the stern, uncompromising terms of the royal proclamation at the head of it. I am the less concerned to do so, inasmuch as such a line of argument impales its adherents on a dilemma whereof either horn is fatal. For the more widely vaccination was enforced upon and practised by the German people before and up to the great pandemic in 1871-72, the more dismal the failure of vaccination to protect that people as a whole; and the less widely spread the practice, the yet more dismal the failure to protect the vaccinated part of it. Under these conditions we find such results as these:—

TABLE X.—*Classification of Small-Pox in Five German Localities.*

Place.	Period.	Cases.	Vaccination Not Stated.	Unvaccinated.	
				Below Legal Vaccination Age.	Of Legal Vaccination Age.
Neuss	1865-73	248	0	0	0
Wesel	'70-73	523	1	4	4
Cologne	'71-73	2,361	79	22	12
Mulheim	'71-72	183	0	7	0
Krefeld	'71-72	118	1	1	0
Totals		3,433	81	34	16

Here we have a record of 3,433 cases, whereof, on any reckoning, only 50 were recorded as unvaccinated. But in an inquiry as to vaccination *law*, as distinguished from voluntary vaccination, it is clear that all cases below the legal age limit should be excluded, inasmuch as vaccinations below that age are voluntary vaccinations. The point however need not be pressed, since a total of 50 out of 3,433 gives only an unvaccinated proportion of 1·4 per cent. Practically, 99 out of every 100 of these patients had confessedly undergone a process which the Parliament of England consented to enforce by law, on the strength of the emphatic promise of "the certainty of vaccination as a preventive "of small-pox."

Coming back from this short excursion into foreign statistics, we find plentiful evidence from English cities of the powerlessness of vaccination, however thoroughly carried out, to protect a community from epidemics of great severity. The quality of the vaccination may be as high as its quantity, and the result still a futility. The quality is attested by the bonus system, under which a second payment is made to the public vaccinator over and above his ordinary fee, when he is on inspection found to reach a certain high standard of thoroughness, as estimated by magnitude of resulting scar. This is not the place to discuss the method of

such estimation; I content myself with simply expressing my conviction that it is pathologically absurd. But taking it seriously, I find that the bonus earnings of Sheffield under this regulation stand thus:—

TABLE XI.—*Awards of Annual Vaccination Bonuses at Sheffield.*

Year.	£ s.	Year.	£ s.	Year.	£ s.
1876.....	341 15	1881	202 7	1886.....	189 3
'77.....	181 16	'82	203 14	'87.....	190 8
'78.....	187 13	'83	183 5	'88.....	178 18
'79.....	172 3	'84	191 10		
'80.....	184 12	'85	196 –	Total	2,603 4

So that Sheffield, vaccinally one of the most faithful of places on earth, in thirteen *years* ending with 1888 earned vaccination bonuses to the amount of 2,603*l.* 4*s.*, and in the thirteen *months* ending March, 1888, she reaped her reward in 6,088 cases of small-pox; or a case for every half sovereign of bonus, and 882 over. Of these 6,088 cases, 5,035, or 83 per cent., were confessedly vaccinated. The compulsion of vaccination by law will never, it is safe to affirm, develop the vaccination of a city to a higher perfection, quantitatively and qualitatively, than that of Sheffield in 1888; and the experience of Sheffield demonstrates conclusively that such compulsion will never preserve a city from devasting epidemics. I am of course aware that much ingenious sophistry has been applied to the Sheffield returns on the basis of a census held by Dr. Barry, so as apparently to show a heavier incidence of small-pox on the unvaccinated than on the vaccinated portion of the community. But in this there was an underlying fallacy, inasmuch as the census was not taken until the epidemic was far advanced, and a great transference had taken place from the unvaccinated to the vaccinated classes of the inhabitants. By this method it is easy to represent an entirely equal incidence of small-pox on the two classes as if it were to any required degree excessive upon the unvaccinated class. To show how this can be done I take a simple imaginary example, thus:—

Let there be a village of 100 inhabitants, of whom 90 vaccinated and 10 unvaccinated, and suppose small-pox to break out there and last for a month, with a 10 per cent. incidence on each class. This would give—

Vaccinated 90, of whom 9 attacked, or 10 per cent.
Unvaccinated 10, of whom 1 attacked, or 10 per cent.

But during the month let 8 of the 9 remaining unvaccinated be persuaded or frightened into getting themselves vaccinated. A census of the village held during the last week of the month would then give—

Vaccinated 98, of whom 9 attacked, or 9·1 per cent.
Unvaccinated 2, „ 1 „ „ 50 „

And whoever will read carefully the cross-examination of Dr. Barry before the Commission, will see that the fallacy thus illustrated pervades the whole of the Sheffield report, and vitiates all the elaborate comparisons which, in the introduction thereunto, Sir George Buchanan drew between the vaccinated and the unvaccinated classes to the disadvantage of the latter. Of the great Sheffield investigation no certainly established result remains save the broad fact that a city wherein the force of compulsory vaccination could no further go, but wherein sanitation has been neglected, may suffer terribly from epidemic small-pox. And this is the evidence in which so many of these towns concur, the story of Warrington and of Willenhall, for instance, being but an echo of that told by Sheffield.

Hence we may well adopt the phrasing of the Dissentient Report, sec. 72, and conclude on this portion of our investigation that "it is superfluous to cite further evidence at this stage to "prove, what is no longer denied by anybody, that small-pox "attacks the vaccinated." But I must be allowed to repeat that this assertion which is no longer denied by anybody is itself *the diametrical contradiction of the promises which passed the law.* These promises are now a mere protested bill with a bankrupt acceptance whereunto no man with a shadow of scientific credit to lose will venture to put his hand.

V.—*Comparative Statistics of Vaccinated and Unvaccinated.*

So far then as any defence remains for a compulsory vaccination law it will perforce have to be founded on a comparison between the two classes, vaccinated and unvaccinated. And here at once a preliminary protest becomes necessary. These comparative statistics are all supplied by one of the two parties to the dispute, and the other party is allowed no opportunity of checking them; and even the party which supplies them so far as they are supplied, is permitted to supply or withhold them at its own sweet will. The result is shown in the huge proportions of cases "not stated" as to vaccination in the small-pox mortality returns. I submit that so long as the law interferes with small-pox and vaccination at all, it might at least do a little to secure for us some approach to statistical truth. If any medical man who filled up a small-pox death certificate without entering the vaccinal condition of the patient were liable to a fine of 20*s.* and costs, and to a month's hard labour without the option of a fine if that condition were afterwards shown to have been wrongly stated; if the Registrar-General were compelled to publish in his weekly returns the full

name and address of every alleged unvaccinated small-pox death; and if, for purposes of check, the vaccination registers were open to public search for a small fee of, say, 6*d.*; I believe in the course of very few years the whole face of these comparative statistics would be changed out of recognition. We find in the Registrar-General's 58th Report, p. xxv, that that official guardian of the purity of our public statistics secured 13 convictions in the year for "Offences against the Registration Acts," including 7 cases of "giving false information," yet so far as I ever could learn no prosecutions followed when the "unvaccinated" deaths at West Ham were exposed, nor when in 1892 General Phelps applied to the Birmingham statistics the crushing exposure of which the Royal Commission refused to receive evidence; nor even when in the same year I was able to bring home the exposure to head-quarters, and to show how Thomas Port, vaccinated in infancy and twice successfully re-vaccinated in the Royal Navy, and dead of confluent small-pox in the London Hospital Ships, had been made to appear in the Registrar-General's returns as a "no state-"ment" case, where I suppose he remains to this day. And even the official classification itself is totally at fault in having no column for *re-vaccinated* cases. These can never appear in the Registrar-General's returns as more than "vaccinated," and, as Thomas Port's case shows, they do not always get even so far as that;—an arrangement very satisfactory to those who persistently proclaim the complete immunity of the revaccinated. The magnitude of the statistical scandal—for it is nothing short of that—hence resulting can be indicated in the following table:—

TABLE XII.—*Small-Pox Deaths, Vaccinated, Unvaccinated, and No Statement, extracted and calculated from the Registrar-General's Fifty-eighth Report, p. lii.*

	1891.	1892.	1893.	1894.	1895.	Total for Quinquennium.
Total deaths	49	431	1,457	820	223	2,980
Vaccinated	3	55	150	153	33	394
„ per cent.	6·1	12·7	10·3	19	15	13·2
Unvaccinated	17	106	253	176	61	613
„ per cent.	34·6	24·5	17·3	21·4	27	20·5
No statement	29	270	1,054	491	129	1,973
„ per cent.	59·2	62·6	72·3	59·8	58	66·2

We thus find that the all-important evidence as to the vaccinal condition of patients dying from small-pox has been suppressed in no less than two-thirds of the total cases. Now for my own part I have met such an energetic eagerness on the part of the

medical profession to point a moral and adorn a tale with an unvaccinated death, that I find it quite inconceivable that a single one of the 1,973 unstated cases should have really escaped the performance of the rite. And on this supposition we should have for the quinquennium 1891-95, vaccinated deaths 2,367 out of the total of 2,980; a percentage of 79·4, and a sufficiently close approximation to my estimate, mentioned above, of not more than 80 per cent. of the population as vaccinated.

And much the same thing holds good when we examine the returns for the earlier ages exclusively. Extracting and calculating from the annual Reports of the Registrar-General for the quinquennium just concluded, we have—

TABLE XIII.—*Small-Pox Deaths amongst Children according to Registrar-General's Annual Reports, Quinquennium* 1891-95.

	Under 1 Year.		Under 5 Years.	
	Number.	Per Cent.	Number.	Per Cent.
Vaccinated	23	6·2	33	4·4
Unvaccinated	112	30·4	263	35·7
Not stated	233	63·3	441	59·8
Total	368	—	737	—

Here again we have the same suppression of the facts, but with less excuse. For it is simply preposterous to urge that the vaccinal condition of an infant under a year old cannot be discovered. Yet nearly two out of every three deaths at this tender age fail to be reported on in this essential particular. And again, by adding the not stated and vaccinated classes together we obtain a total of 256 for the ages under 1 year, and 474 for ages under 5, a percentage of 69·5 and 64·3 on the respective totals at those ages. Considering that the portion of the population living at these very early ages will include a considerable proportion of infants below the vaccination age, and that we can fairly infer from sec. 102 of the Dissentient Report that such infants constitute a not inconsiderable fraction of the total small-pox mortality among these early ages of the Registrar-General's Reports, these percentages of 69·5 and 64·3 are sufficient to dispense with the necessity of assuming any special influence of vaccination upon small-pox.

In another direction this table is no less significant.

To begin with, children under 1 comprise all the babies below vaccination age; wherefore in any number of children, taken as they come, of all ages up to 12 months, there will be a far larger proportion of unvaccinated than in a similar group of children at all ages up to 5 years. That is to say, the percentage of vaccinated

children under 1 is of necessity smaller than the percentage of vaccinated children under 5. Yet the table shows that the percentage of vaccinated small-pox mortality under 1 (6·21 per cent.) was getting on for half as much again as the similar percentage (4·4 per cent.) under 5; while on the other hand the unvaccinated mortality under 1 formed a smaller percentage of the whole (30·4 per cent.) than did the unvaccinated mortality under 5 (35·7 per cent.). The same figures have a bearing on the question of recency. For the vaccination of children under 1 must on the average be more recent than the vaccination of children under 5; yet it is the more recent vaccination which is the greater failure. And claiming as I do the whole of the "unstated" in this table as really belonging to the vaccinated, we find once more that the vaccinated supply nearly two-thirds of the small-pox deaths under 1 year of age. In five years we have on this computation 256 deaths of children under 1 year concerning whom the doctors either explicitly confess their vaccinated condition, or at all events do not dare to deny it. And then they talk of "absolute protection for a time;" and the Commission recommends us to be vaccinated every nine years." Why, if these poor little mites had had as many lives as cats, they might at this rate have commenced each life with a vaccination in the spring and ended each one with small-pox in the autumn, and have still had time to lose all the nine before arriving at the re-vaccination age as proposed by the Commission.

Then again the 23 admitted deaths of vaccinated children under 1 year have a peculiar significance just now, when Dr. Bond and the Jenner Society are protesting that to ensure "protection" we must be vaccinated again and again: we must renew "the premium of insurance." It would be interesting to know how many premiums of insurance ought to have been paid on behalf of these 23 poor little mites, who were *confessedly* born, cowpoxed, smallpoxed, and buried, all within a single circle of the seasons.

But these considerations have brought us into contact with the different ages at which small-pox either occurs or becomes fatal. And, so far, I have endeavoured to show that vaccination is not the cause of the favourable changes which have taken place in respect of small-pox. I now turn to the endeavour to find what that cause has really been; and I shall hope to show that a cause, at once true and sufficient, can be found in the complex of measures to which the collective name of "Sanitation" has been applied.

VI.—*Sanitation and Age-Incidence.*

It is this complex of measures which has furnished us with the ordinary and received methods of contending against the zymotics as a whole. But in the particular case of small-pox it

has been urged, and it is in fact the official view prevalent in our country to-day, that sanitation is either of no avail at all, or of so little as to render imperative the universal adoption of the special measure, or menagerie of measures, known by the name of "Vacci-" nation." That this is the official view is shown by the following considerations:—

The Registrar-General, in the 43rd Report for 1880, argues that the decline in small-pox cannot be due to sanitation entirely, on the ground that it has been greater than that obtaining in the case of other diseases, and greater in young lives, *e.g.*, children under 5 years of age, than at later ages, or all ages. And the same view the witness representing the department also endeavours to enforce in his evidence before the Commission. Dr. Ogle there says (*Q.* 351): "If it were true that the great fall of 72 per cent. " in small-pox was due to improved sanitation, which doubtless " has reduced mortality very considerably, we should expect, " naturally, that the fall would have been shared by persons of all " ages, but nothing of the kind is the case." And again (*Q.* 493): " Speaking roughly, I do not suppose you can attribute (to sani-" tation) more than you can to the decline in the general death-" rate." And Mr. Thorne Thorne, both generally, as in *Q.* 744, and in particular by his citation of the case of the s.s. "Preussen" (*Q.* 994 sq.), announces on behalf of the Medical Department of the Local Government Board, that "as far as we have been able to " gather there is absolutely no other explanation for this marked " reduction of small-pox mortality amongst children, except the " mere fact that children are nearest, in point of time, to the date " at which they were vaccinated." I propose therefore to now consider, in the light of statistical fact, the position that sanitation is of no practical avail against small-pox.

There is an initial difficulty as to terms. Within the scope of the word "sanitation" I include *all* the conditions of healthy living. I do not propose to confine it to the narrow sense in which it applies only to drainage.

Now to sanitation in this wider sense small-pox is very highly amenable, both (1) at all ages, and (2) at ages under 5. To show this we will compare the "expected" mortalities of a typically unhealthy locality such as Liverpool with those more favoured places—the "healthy districts" of the Registrar-General—where the entire annual mortality does not exceed 17 per thousand. This we can do for a period when small-pox was prevalent enough to fairly eliminate the dangers attendant on small numbers, by using the materials supplied in the Supplement to the Thirty-fifth Annual Report of the Registrar-General, pp. xxix, cxii and cxxviii. The result will be found in—

TABLE XIV.—*Influence of Sanitation on the Age Incidence of Zymotic Mortality. Comparison of Liverpool with "Healthy Districts" as to Expected Deaths per Million Born Alive.*

[Extracted from "Supplement to 35th Report of Registrar-General," pp. xxix, cxii, and cxxvii.]

1	2	3	4	5	6	7	8	9	10	11	12
	Expected Mortality per Million Born Alive in						Percentage that (A) is of (B).			Percentage of the said expected All Age Mortality borne by Children under 5.	
	Healthy Districts (A).			Liverpool (B).							
	All Ages.	Under 5.	Over 5.	All Ages.	Under 5.	Over 5.	All Ages.	Under 5.	Over 5.	Healthy Districts.	Liverpool.
	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.
Cholera	2,244	399	1,845	16,489	4,255	12,234	13·6	9·3	15·0	17·7	25·8
Small-pox	2,359	602	1,757	8,141	5,175	2,966	28·9	11·6	59·2	25·5	63·5
Diarrhœa and Dysentery	21,217	9,354	11,863	61,446	51,911	9,535	34·5	18·0	124·4	44·0	84·4
Measles	6,912	5,257	1,655	26,973	25,514	1,459	25·6	20·6	113·4	76·0	94·5
Whooping cough	10,234	9,650	584	34,021	32,551	1,470	30·0	29·6	39·7	94·2	95·6
Fevers (typhus, &c.)	28,146	2,807	25,339	76,563	9,297	67,266	36·7	30·1	37·6	9·9	12·1
Scarlatina	21,403	11,373	10,030	38,302	26,818	11,484	55·8	42·4	87·3	53·1	70·0
Other zymotics	22,082	6,135	15,947	18,632	12,093	6,539	118·5	50·7	243·8	27·7	64·9
Diphtheria	10,292	4,184	6,108	4,416	3,395	1,021	233·0	123·2	598·2	40·6	76·8
Total zymotics	124,889	49,761	75,128	284,983	171,009	113,974	43·8	29·0	65·9	39·8	60·0

The teaching of this table is as follows :—

Supposing a million children to be born alive in Liverpool, and another million to be born alive in one of the "Healthy "Districts," and to be kept under observation through life and until death. Then, taking for example small-pox as subject of investigation, it would be found that in the Healthy District, on the basis of the rates observed up to the date of the table, 2,359 of the million will ultimately die of small-pox, as against 8,141 in Liverpool. This shows that the advantage of greater healthiness of living, or greater sanitation, does affect very considerably the small-pox mortality. In other words, that small-pox is highly amenable to sanitary influence. Nor is this all. For it will be found that of the total 2,359 small-pox deaths that may be expected in the Healthy District, only 602 will occur in children under 5 years of age; whereas in Liverpool, of the total 8,141 small-pox deaths, no less than 5,175 will occur before the completion of the fifth year. Or again, that while in the Healthy District the children's share of such small-pox mortality as there is amounts to only 25·5 per cent., in Liverpool, the children's share of the same mortality rises to no less than 63·5 per cent., So that, though the difference between the sanitary condition of Liverpool and a Healthy District causes the total general small-pox mortality of the latter to be only 28·9 per cent. of the similar mortality in the former, the Healthy District small-pox mortality under 5 suffers a far greater reduction still, being but 11·6 per cent. of the similar mortality in Liverpool. Whereby it is shown, in contravention of the official view, first, that small-pox is at all ages highly amenable to sanitary influence, and secondly, that its amenability is greater at the earlier ages than at the ages beyond childhood in the proportion of 59·2 to 11·6. From an inspection of the columns for the comparative percentages at all ages and at ages under 5, we find that, as compared with other diseases—

(1.) In respect of amenability to sanitary influence, small-pox is excelled at all ages collectively by cholera and measles only;
(2.) And at ages under 5, by cholera alone.

And further, the table shows the fallacy of the argument adduced by Dr. Ogle in *Q.* 351, that sanitation cannot have been the cause of a reduction in mortality from a given disease unless that reduction has been shared by persons of all ages. *In every one of the diseases contained in the table the children's share of the mortality is less in the Healthy District than in Liverpool;* whilst in no case save that of small-pox alone is it even alleged that there is

or can be any other cause of the difference beyond the greater healthiness of living in the one place than in the other. Wherefore not only does sanitation change the general mortality, but it changes the infant mortality to a vastly greater extent than it does the adult mortality. And this in practically all the zymotics, whether taken individually, or collectively as a group, with the results totaled.

Or, to put the same thing another way, if we could suppose a million of persons *of all ages* to be removed from the conditions of life which prevail in Liverpool, and transferred to such conditions as rule in the "Healthy Districts," the chance of escaping death by any of the zymotics would be greatly increased for all ages, but would be increased by far the most for the ages under 5 years; and this for all zymotics, but most for cholera, small-pox, and measles.

If, in the face of such an investigation, it be still maintained that the influence of vaccination as distinct from sanitation is to be seen in the diminution of the children's share of whatever small-pox mortality is going, I reply that, to estimate such an argument, we must compare the change which has taken place in the age-incidence of small-pox with the similar change, if any, in the case of other comparable diseases, and with the like change, if any, in the unvaccinated class of small-pox patients. Such is probably the only manner in which the principle of the "Control "experiment" can be applied to the question. This brings us to consider:—

VII.—*Comparative Changes of Age-Incidence in the Zymotics.*

Here the first question will of necessity be: With what other diseases shall small-pox be compared?

Now it is obvious that, for the purpose of comparing diseases on the basis of changes in their age-incidence, we must find other diseases which affect patients of all ages. On this head I agree in full with Dr. Ogle in his evidence before the Commission (*Q.* 518), that "Fever is the only one of the zymotic headings that "you can take, because it is the only one which affects all ages to "any extent." I compare, therefore, small-pox with Typhus and with Typhoid in the annexed Table XV.

TABLE XV.—*Children's Share of the Mortality from Small-Pox, Typhus, and Typhoid, respectively, in Quinquennia. Percentage of Deaths under 5 to Deaths at all Ages for Four Successive Quinquennia.*

[Extracted from the Registrar-General's Annual Reports, "England: Causes of Death."]

	1871–75.		1876–80.		1881–85.		1886–90.		Percentage Diminution of Percentage (*i.e.*, Decrease per Cent. of Children's Share) comparing 1st with 4th Quinquennium.
	Numbers.	Per-centage.	Numbers.	Per-centage.	Numbers.	Per-centage.	Numbers.	Per-centage.	
Small-pox ..	14,834* / 47,595	= 31·1	2,440 / 9,726	= 25·0	2,451 / 10,433	= 23·4	363 / 1,846	= 19·6	36·9
Typhus	617 / 9,517	= 6·4	259 / 4,238	= 6·1	106 / 3,015	= 3·5	31 / 904	= 3·4	46·8
Typhoid	7,617 / 43,679	= 17·4	5,562 / 34,651	= 16·0	2,678 / 28,788	= 9·3	1,895 / 25,221	= 7·5	56·8

* Table 31 of the Forty-third Report yields a total of 47,696 small-pox deaths at all ages for this quinquennium, on account of the inclusion of chicken-pox therein. This does not affect the percentage.

The figures as given above exclude from both numerator and denominator the chicken-pox deaths for 1875, thus exactly following the Registrar-General's actual figures in each annual Report, the change to the present rule of omitting chicken-pox having first taken effect in the Forty-fifth Report.

Subsequently to 1875 the chicken-pox deaths are uniformly excluded.

But this table contains two difficulties:—

(A.) In 1871-74, the deaths from "chicken-pox" are included in those from small-pox, thus much increasing the children's share of the small-pox mortality for the quinquennium 1871-75 as compared with the latter quinquennia, wherein chicken-pox is omitted. To remedy this defect we might either simply deduct the chicken-pox from the 1871-74 figures, or we might replace the chicken-pox in the subsequent quinquennia. Which is the proper correction?

In all the tables I have set out in this paper, fatal chicken-pox has been included in small-pox. I am glad to note that Mr. Noel Humphreys has adopted this course in some of the tables in his recent paper, and only wish he had done so in all. For as it is held by all authorities that chicken-pox is never fatal, it follows by mere logical conversion that nothing that was fatal was chicken-pox. How then ought we to describe these so called chicken-pox deaths? I consider the answer to be contained in Sir Thomas Watson's "Lectures on the Principles and Practice of Physic," vol. ii, p. 805, where he says: "These mild and irregular forms of

"variola, both parents and medical men, wishing, I suppose, to "believe nothing in disparagement of the protective power of "vaccination, are apt to consider and to call chicken-pox." I am glad that the responsibility thus falls on this distinguished and eminent physician, whose vaccinal orthodoxy was beyond suspicion, of thus ascribing the chicken-pox deaths to their *vera causa* in small-pox, and of also assigning them, for reason given, to the vaccinated class of small-pox mortality. It is pleasant to have an acknowledgment from such a quarter that vaccination has been saved by the sacrifice of pathology.

We shall have then to amend Table XV by including the deaths from chicken-pox for all the years contained in it.

(B.) The other difficulty arises from the somewhat curious treatment of remittent fever by the Registrar-General.

It would appear from the note appended to Table XV of the Fifty-third Report, p. 38, that from 1869 to 1880, deaths from remittent fever under 5 years of age were classed under typhoid; thus increasing, for the years which include our first and second quinquennial period, the infant share of typhoid mortality. To render the comparison fair, therefore, the deaths from remittent fever of children under 5 should be reckoned in also for the last two quinquennia. This we can do by fetching them back out of the class of "Malarial Diseases" to which they have been assigned, and restoring them to typhoid as before. When these amendments have been made in the table it will present the appearance shown in Table XVI.

TABLE XVI.—*The same Table corrected for Chicken-Pox and Remittent Fever.*

	1871–75.		1876–80.		1881–85.		1886–90.		Percentage Diminution of Percentage (*i.e.*, Decrease per Cent. of Children's Share) comparing 1st with 4th Quinquennium.
	Numbers.	Per-centage.	Numbers.	Per-centage.	Numbers.	Per-centage.	Numbers	Per-centage.	
Small-pox	14,929 / 47,696	= 31·3	2,938 / 10,245	= 28·6	3,002 / 11,025	= 27·2	820 / 2,320	= 35·3	− 12·7
Typhus	617 / 9,517	= 6·4	259 / 4,238	= 6·1	106 / 3,015	= 3·5	31 / 904	= 3·4	46·8
Typhoid	7,617 / 43,769	= 17·4	5,562 / 34,651	= 16·0	3,312 / 29,422	= 11·2	2,146 / 25,472	= 8·4	51·7

It is not supposed that the reading of this table, which I proceed to consider in this its finally amended form, will present any

difficulties. The comparison is strictly as to the children's share of whatever mortality there is, whether much or little, from the three diseases selected for examination—the selection, it may be repeated, being in accordance with Dr. Ogle's own opinion that these diseases are of the only kind you can fairly take. It appears that in the five years ending with 1875 there were 47,696 deaths from small-pox at all ages, whereof 14,929 were of children under 5; a percentage share amounting to 31·3 per cent. falling to the lot of these children. In the five years ending 1890 the total small-pox mortality has enormously diminished, the deaths in that period only totaling to 2,320 for all ages. But the children's share of this diminished mortality is not diminished; on the contrary, it is a little larger than before, there being 820 of these deaths to go to the account of children under 5, a percentage share of 35·3 per cent. The diminution of the children's share of small-pox as between the first and the last period in the table is therefore a minus quantity; that is to say, it is an increase. The actual increase, or difference between the two percentages, is 4; and 4 is 12·7 per cent. of 31·3. Turning now to the incidence of typhoid, we find that of 43,769 deaths at all ages in the five years ending 1875, 7,617 were of children under 5—a children's share amounting to 17·4 per cent. Whereas in the last quinquennium of the table there were 25,472 deaths at all ages, and of these 2,146 in children under 5, a children's share of 8·4 per cent. And if 8·4 be subtracted from 17·4, the difference will be 9; and 9 is 51·7 per cent. of 17·4. So that, comparing the first with the last quinquennium, the children's share of the current typhoid mortality is found in the interval to have diminished by 51·7 per cent. Thus diseases to which no vaccination has been applied, and the only modifying influence upon which has been "sanitation" in the broad sense above assigned to the word, have altered in the matter of their incidence upon the younger lives not less than small-pox has done.

So that if it be argued that the reduction of small-pox cannot be due to sanitation because it has taken place chiefly in the young lives, and that this change of age-incidence, being peculiar to small-pox, must be due to a cause (vaccination) which is also peculiar to small-pox, I reply that the diminution in the young-life share of the mortality from small-pox has of late years been of doubtful actuality, and that it is certainly not peculiar to small-pox, having in fact taken place to a no less extent in other diseases; and that, no vaccination having been applied to those other diseases, it becomes clear that vaccination is not an indispensable cause of change in the age-incidence of the mortality from any disease.

I therefore submit, as conclusions from these tables:—

(1.) However you reckon the doubtful elements, it remains true that the children's share of fever mortality has more largely declined than their share of small-pox mortality.

(2.) When proper corrections are made, it is shown to be at least doubtful whether the children's share of small-pox mortality has of late years decreased at all.

(3.) Even allowing it to have decreased, the decrease is not due to vaccination, since a like decrease to a greater extent has taken place in diseases to which no vaccination is as yet applied.

As a further indication of the importance of the proper treatment of chicken-pox I submit the following:—

TABLE XVII.—*Share of Small-Pox Mortality borne by Children Under 5, as affected by the inclusion or exclusion of the Chicken-Pox Mortality.*

	Small-Pox Deaths including Chicken-Pox.		Chicken-Pox.		Small-Pox Deaths excluding Chicken-Pox.		Percentage that B is of A.	Percentage that Y is of X.	Difference between Chicken-Pox in and Chicken-Pox out.
	A. All Ages.	B. Under 5.	All Ages.	Under 5.	X. All Ages,	Y. Under 5.			
1856–60	19,270	11,010	233	214	19,037	10,786	57·1	56·6	0·5
'61–65	23,007	12,477	262	246	22,745	12,231	54·2	53·7	0·5
'66–70	11,779	6,403	312	297	11,467	6,106	54·3	53·2	1·1
'71–75	47,696	14,929	376	350	47,320	14,579	31·3	30·8	0·5
'76–80	10,243	2,938	517	498	9,726	2,440	28·6	25·0	3·6
'81–85	11,025	3,002	592	551	10,433	2,451	27·2	23·4	3·8
'86–90	2,320	820	474	457	1,846	363	35·3	19·6	15·7
'91–95	3,515	1,313	535	511	2,980	802	37·3	26·9	10·4

This table shows how, as the total of small-pox declines, the importance of chicken-pox increases, in virtue of its increased influence on the age-incidence percentages. This makes it the more to be regretted that in Mr. Noel Humphreys's paper, his Table IV should include chicken-pox in the first period only. The table in question is thus doubly discounted in its accompanying statement that in the last decennium, 1885-94, the rates for small-pox further fell, for ages under 5, and 5—10, from 128 and 63 of the former decennium to 50 and 15 respectively. First, because no proper

allowance is all the time being made for chicken-pox; and secondly because the fall, whatever it really was, was coincident with a rise in the vaccinal default from about 5·5 per cent. to the 16·1 per cent. of 1893. In the light of these facts I propose to consider a little further the conclusions above arrived at.

The last conclusion (3) can further be strengthened directly. Not only has the children's share of small-pox mortality not declined to a greater extent than is the case with other diseases to which vaccination does not apply, but—

> Taking the children's share of small-pox mortality in times when all were unvaccinated, and comparing it with their share of such small-pox as is still unvaccinated, it will be found that the decline in this exclusively unvaccinated class has been as great as in the vaccinated and unvaccinated taken collectively.

We are assured that before vaccination times, 80 per cent. of small-pox mortality was contributed by children under 5. Numerous authorities could be cited for this assertion. It may be enough to refer to—

> McVail, "Vaccination Vindicated," pp. 17 and 18.
> McVail, "Small-pox in Kilmarnock in the last Century," in the Local Government Board Report for 1884.
> Sir John Simon, Appendix to First Report of the Royal Vaccination Commission, p. 76.
> Mr. Thorne Thorne, quoting the passage last referred to, when replying to Q. 820.

And we are further assured that this 80 per cent. has been reduced to "about 30 per cent." (*Cf.* McVail, *op. cit.*, p. 18.)

This assertion as to the reduction of the children's share of the mortality from small-pox may be taken as about correct for the time at which it was made. Taking the figures for the quinquennium 1886-90, and including in every member of the comparison fatal chicken-pox under small-pox, we should obtain a total of 2,320 small-pox deaths, whereof 820 were under 5 years of age, a percentage of 35·3. These figures include the small-pox deaths of all classes, the vaccinated, the unvaccinated, and the "not "stated." But we can next proceed to compare these inclusive figures with the figures for the exclusive class of unvaccinated, and the result is shown in Table XVIII, wherein it is set forth that of the 452 unvaccinated small-pox deaths in that quinquennium, 146 were under 5 years of age. This gives a percentage of 34·3. So that the reduction in the children's share of unvaccinated small-pox has been for this quinquennium fully up to the general average of reduction.

TABLE XVIII.—*Comparison of the Total Children's Share of the Small-Pox Mortality of all Classes (Vaccinated, Unvaccinated, and "Not "Stated"), with the Share of the Unvaccinated Small-Pox Mortality borne by Unvaccinated Children, for the Quinquennium* 1886-90. *Fatal Chicken-Pox included in Small-Pox.*

Age-Periods.	Small-Pox Deaths, 1886-90.			
	All Classes.		Unvaccinated only.	
	Numbers.	Percentage.	Percentage.	Numbers.
Under 5 ..... / All ages.....	820 / 2,320	= 35·3	34·3	= 146 / 425

Since calculating out the above table the publication of the Registrar-General's Fifty-eighth Report has completed another quinquennium which may be combined with 1886-90 to make the decennial return for 1886-95, the last ten years of registration. The table will then stand thus:—

TABLE XIX.—*Extension of Table XVIII to the Decennium* 1886-95.

Age-Periods.	Small-Pox Deaths, 1886-95.			
	All Classes.		Unvaccinated only.	
	Numbers.	Percentage.	Percentage.	Numbers.
Under 5..... / All ages.....	2133 / 5835	= 36·5	42·7	= 444 / 1038

Thus a change which is held to demonstrate the indispensable value of vaccination, is shown to have taken place to a hardly less extent amongst the unvaccinated than in the whole category of small-pox, taking vaccinated, unvaccinated, and not stated together.

Or otherwise:—While the general children's share of small-pox mortality has declined from 80 per cent. to 36·5 per cent., the unvaccinated children's share of unvaccinated small-pox mortality has declined from 80 per cent. to 42·7 per cent.

But it may be argued that these later years give but small figures to argue on, and that chicken-pox ought not to be included. I reply, firstly, that in England and Wales these latter years are also the least vaccinated of any since 1871, and that the smallness of the figures for the small-pox deaths of unvaccinated children shows that it is not the dangerous thing to neglect vaccination that it is said to be. And secondly, we can go to the returns of unvaccinated small-pox since 1881, and omitting all notice of vaccinated small-pox altogether, and bringing the figures up to

the date of the last returns, simply compare the thus-obtained results with those of pre-vaccinal times. Table XX will enable us to do this, and to show that in a class where vaccination, not having been applied, can contribute nothing to the phenomenon, the children's share of small-pox mortality has been reduced to practically half of what that share is alleged to have been in the eighteenth century.

TABLE XX.—*Unvaccinated Small-Pox Deaths*, 1881-95.

Year.	A. All Ages.	B. Under 5.	Percentage, B of A.
Prior to vaccination	?	?	80
1881.....	1,068	407	38·1
'82.....	325	109	33·5
'83.....	162	61	37·6
'84.....	595	252	42·3
'85.....	795	330	41·5
'86.....	43	18	41·8
'87.....	111	33	29·7
'88.....	269	95	35·3
'89.....	2	0	—
'90.....	0	0	—
'91.....	17	9	52·9
'92.....	106	38	35·8
'93.....	253	131	51·7
'94.....	176	85	48·2
'95.....	61	35	57·3
Totals	3,983	1,603	40·2

Again, it may be urged that small-pox affords the only case in which the infant and child mortality has declined concurrently with an increasing mortality for adults. It was

Decrease in Children + Increase in Adults

that was described as a unique condition, pointing to a unique cause, which could only be vaccination.

I believe it will be admitted on all sides that this contention may be fairly as well as conveniently, expressed thus:—A disease which succeeds in killing more adults would have killed more children too, but for a disturbing cause, vaccination.

In reply I deny that the position is unique. It is not true that small-pox is the only disease which, having killed more adults, has yet failed to kill more children:—whence it follows that the assumption that small-pox, of which the conditions are true, must of necessity find the causation of those conditions in vaccination, remains a mere assumption, unsupported by proof. There is another epidemic disease, against which no inoculative prophylactic has as yet been adopted, which has nevertheless behaved in the same way. This is influenza, the age-incidence of

whose mortality is compared with the similar age-incidence of small-pox mortality in Tables XXI and XXII. The sources and the method of such comparison are as follows :—

Within the limits of civil registration there have been two distinctively epidemic occurrences of influenza, viz., in 1847-48 and in 1890-91. The age-incidence of these two visitations is very fully set forth in a table on page xx of the Fifty-fourth Report of the Registrar-General, and there marked as Table G.

TABLE XXI.—*Deaths Registered as due to Influenza, per Million Living at each Age.*

Age-Periods.	1847-48.	1890-91.
Under 5	713	306
5—	80	55
10—	49	46
15—	51	115
25—	79	197
35—	139	347
45—	284	595
55—	809	1,060
65—	2,372	1,985
75—	5,510	3,355
85—	11,243	4,821

The figures show at a glance that whilst there has been a considerable diminution of the mortality under 10 years of age per million living at that age, yet at every age between 15 and 65 the mortality has greatly increased. If we now take as basis of comparison the returns for small-pox in the two periods 1847-53 and 1872-87, returns which are given in the well known "Table "L" of the Registrar-General's Forty-third Report, and which are put in as evidence on page 114 of the First Report of the present Vaccination Commission, we find that the same thing is indeed true of small-pox; but that the adult increase is much more marked in the case of influenza. To show this in detail, I add, in Table XXII, a comparison of the two diseases—

TABLE XXII.—*Small-Pox and Influenza:—Change of Age-Incidence compared.*

Small-Pox.				Influenza.		
Mortality of		Increase or Decrease Per Cent.	Age-Periods.	Increase or Decrease Per Cent.	Epidemic of	
1847–53.	1872–87.				1890–91.	1847–48.
1,617	242	— 85	0— 5	— 57	306	713
337	120	— 64	5—10	— 31	55	80
94	69	— 26	10—15	— 6	46	49
109	122	+ 12	15—25	+ 125	115	51
66	107	+ 62	25—35	+ 149	197	79
			35—45		347	139

We there see that while both diseases show a diminution of the infant and child mortality, and while, also, both show adult increase, this increase, for ages 15 to 25, is 125 per cent. for influenza, and only 12 per cent. for small-pox; and while the small-pox mortality for the ages 25 to 45 has increased by 62 per cent., the same ages show for influenza an increase of 149 per cent.

Thus the phenomenon in question is not unique. It occurs in the absence as well as in the presence of vaccination; and there is therefore no evidence pointing to vaccination as its cause.

This investigation on the basis of age-incidence can be further combined with that on the basis of locality. Such a combination has been attempted in the Majority Report of the Royal Commission, followed by Mr. Noel Humphreys in his recent paper, Table VI. That table I here reproduce, as thus:—

TABLE XXIII.—*Child Mortality from Small-Pox in relation to the Neglect of Vaccination in Six Towns which have recently suffered from Small-Pox Epidemics.*

["Final Report," pp. 50 and 176.]

1 Towns.	2 Date of Epidemic.	3 Total of Small-Pox Deaths.	4 Percentage of Deaths under 10 to Total Deaths from Small-Pox.	5 "Unaccounted for" as to Vaccination.
Warrington	1892–93	62	22·5	4·8
Sheffield	'87–88	589	25·6	4·5
London	'92–93	182	36·8	9·9
Dewsbury	'91–92	110	51·8	32·3
Gloucester	'95–96	443	64·5	67·6
Leicester	'92–93	21	71·4*	68·1

* Excluding the deaths of 3 patients in a scarlet fever ward in close proximity to the small-pox hospital, this proportion would be reduced to 66·6 per cent.

Now, to look at this table is to conclude that the unvaccinated children of Leicester suffered more than three times as severely as the vaccinated children of Warrington, and nearly three times as severely as the vaccinated children of Sheffield. But this conclusion is not justified, as the following considerations, for the suggestion of whose argument I am indebted to my friend Mr. Alexander Paul, will, I think, fully show. In the first place, the age-incidence argument is only a fair one when the figures are taken over a large space and a long time. It is not logical to compare thus single outbreaks in particular localities. If in one town small-pox break out in a school, and in another in a factory, the age-incidence will be very different whatever the vaccinal states of the populations concerned. And here, in Warrington, the small-pox hospital was near the great forges, and spread the disease

among adults; in Leicester it was close to the scarlet fever wards, and spread it among children. And more than that, it is clear that the ratio of children's deaths to total deaths may be increased in two ways; either by increasing the number of children who die, or by diminishing the number of adults. For the ratio in question is expressible by a fraction thus :—

$$\frac{\text{Children}}{\text{Children} + \text{Adults}'}$$

and every schoolboy knows that the value of this fraction will be increased *either* by increasing the number of children *or* by diminishing the number of adults. For instance, let small-pox break out in two towns, A and B, of equal population; and let there die in much vaccinated A, 10 children and 990 adults, making the fraction to be—

$$\frac{10}{10 + 990} = \frac{10}{1{,}000} = 1 \text{ per cent.}$$

And in little vaccinated B let there die 10 children and 10 adults. This gives :—

$$\frac{10}{10 + 10} = \frac{10}{20} = 50 \text{ per cent.}$$

Now, although the children's share is fifty times as great in B as in A, yet the total severity of epidemic is fifty times as great in A as in B. And we should have thought that nobody but a Royal Commissioner, or a Registrar-General's official subordinate, would appeal to the contrast between A and B to enforce the moral as to the dire consequences following from the neglect of vaccination. Yet this is exactly what the Commission does in its comparison of the six towns in the table above quoted. For they have reasoned on the children's share of the *deaths* without a checking inquiry as to the children's share of *attack*. This checking comparison we can find in—

TABLE XXIV.—*Children's Incidence of Attack compared with their Incidence of Mortality.*

In.	Percentage borne by them of Total Small-Pox Illness.	Percentage borne by them of Total Small-Pox Deaths.
Warrington	9·83	22·58
Sheffield	12·42	25·60
London	15·21	36·82
Dewsbury	21·64	51·82
Gloucester	35·67	64·52
Leicester	30·53	71·43 (or 66·60)

So that the high proportion of children's deaths in Leicester

seen to have been due to the high proportion of children's attacks. Now further check the above by this table :—

TABLE XXV.—*Actual Numbers on which the above Percentages are based.*

	Under 10.		Over 10.	
	Attacked.	Died.	Attacked.	Died.
Warrington	65	14	596	48
Sheffield*	581	128	4,096	368
London	358	67	1,995	115
Dewsbury	219	57	793	53
Gloucester	706	280	1,273	154
Leicester	109	15	248	6

* The Sheffield figures are estimated on comparison of Dr. Barry's report with the figures given by the Commissioners.

Thus so far as age-incidence is concerned the whole argument against Leicester is made to turn on the *fewness* of the six deaths over the age of 10. Are we then to conclude, that if only Leicester had lost by small-pox a hundred times as many adults as she did, that the value of vaccination would have been shown, on the strength of this age-incidence argument, to have been a vanishing quantity ?

The fact is that the combination of age-incidence and locality only supplies us with a further vindication of the thesis that vaccination has nothing to do with the observed phenomena. This is admirably shown in the table set forth in Sec. 148 of the Dissentient Report, thus—

TABLE XXVI.—*Age-Incidence of Small-Pox in various Districts of Scotland in the Epidemic Year* 1871.

	Total Deaths.	Deaths under 5.	Deaths under 5. Per Cent. of Total.
Principal towns (population above 25,000)	886	195	22·0
Large towns (population from 10,000 to 25,000)	143	32	22·3
Small towns (population from 2,000 to 10,000)	209	55	26·3
Mainland rural districts	183	25	13·6
Insular ,, ...	11	0	0·0

It thus appears clearly that the more generally healthy the conditions of the district, the smaller is the children's share of whatever small-pox the district had.

Reference to this table as being contained in the Dissentient Report makes it incumbent on me to protest in the very strongest

terms against the assertion in the paper of Mr. Noel Humphreys, that "in the Minority Report of Dr. Collins and Mr. Picton, no "explanation of this change of age-incidence is attempted." Of that Minority Report Secs. 139—148 are devoted to the explanation whose existence Mr. Humphreys thus denies.

It therefore remains to find a cause for this shifting of age-incidence of a disease. It is submitted that that cause will be found in sanitation, using the term in the wide sense above attached to it.

The official position, as has been shown above, is—"It cannot "be sanitation which produces change in age-incidence, since "sanitation applies to all ages alike, and would affect all alike "with a similar change."

I reply that this reasoning is: (1) not what we should expect on estimation of the probabilities; (2) not justified by observed statistical fact.

To meet it let us seek some common cause quite apart from small-pox and vaccination, and consider its effects at various age-periods. Such a common cause is locality. *Where you live* is a common cause applied to all ages alike; surely then, if we compare a notoriously unhealthy neighbourhood of London with a suburb of high sanitary repute we ought, according to the medical theory, to find a difference between the mortality of the two which is constant for all age-periods. Let us then compare two different parishes of London, the one, Whitechapel, an east-end parish with a teeming population mostly very poor, and the other Hampstead, a suburb in the north-west, for the most part on high ground, and possessing probably the purest atmosphere of any suburb at a similar distance from the city proper. The result appears in the following table:—

TABLE XXVII.—*Annual Average Death-Rate per Million Living in Decade* 1881-90.

[From Registrar-General's Supplement to Fifty-fifth Report, pp. lxiv and lxxxiv.]

	All Ages.	Under Five.
Whitechapel	19,800	84,845
Hampstead	12,200	48,550
Difference	7,600	36,295
Difference per cent...	62·2	74·7

The result of this comparison is that the differences shown between the all-age and the child-age mortalities are *not* the same.

Hampstead has a superiority of 7,600 deaths per million living at all ages, but a superiority of no less than 36,295 per million amongst little children under 5. And the common cause "*Where "you live*" does *not* affect all ages alike. On the contrary, as common sense would suggest, and as no statistician should require to be told, to the common cause applied alike to all ages the tenderly susceptible infant ages react with vastly greater celerity and certainty.

In this Table XXVII the correction for hospital mortality has been made as indicated in the footnotes to p. lxiv of the Supplement to the Registrar-General's Fifty-fifth Report. In the corresponding page of the Supplement to the Forty-fifth Report, dealing with the preceding decennium, the Registrar-General made the corrections himself, and for that decade the corresponding comparison would stand thus:—

TABLE XXVIIa.—*Annual Average Death-Rate per Million Living in Decade* 1871-80.

[From Registrar-General's Supplement to Forty-fifth Report, pp. lxx and lxxxviii.]

	All Ages.	Under Five.
Whitechapel	23,600	95,830
Hampstead	16,600	57,210
Difference	7,000	38,620
Difference per cent.	42·1	67·5

And an alternative interpretation, for greater clearness, may be applied to the table in this form, thus: If a population living in Hampstead, and as Hampstead lives, were compelled to move into Whitechapel, and there to live as Whitechapel lives, its general mortality would increase from 16,600 per million per annum to 23,600, an increase of 42·1 per cent.; but its infant mortality would experience a much greater rise, namely, from 57,210 per million living under 5 years to 95,830, an increase of 67·5 per cent.

Wherefore it is obviously by no means true that wherever a change in mortality is observed to affect infants more than adults, a cause peculiar to infancy is indicated. And hence when we find infant small-pox to have declined more than general small-pox, there is no need to thence infer any peculiar benefit in infant vaccination. The fact simply indicates the peculiar susceptibility of infants to improvements in the general art of healthy living.

(2.) The second answer to the official position, viz., that it is

not justified by actual statistical results, may be narrowed down to the actual recorded experience of the leading zymotics.

We find, on comparing Liverpool with the "Healthy Districts," that, as we pass from the former to the latter—

(*a.*) Zymotic mortality as a whole lessens.
(*b.*) Of such zymotic mortality as remains, the children's share lessens.
(*c.*) The susceptibility to sanitary interference of a particular disease shows itself, therefore, not only by diminution of absolute mortality, but also by diminution of the children's share of remaining mortality.
(*d.*) In this sense small-pox is highly amenable to sanitary interference; not less but more amenable than almost every other zymotic.

In support of this final assertion (*d*), the accompanying diagram is submitted, showing the "Influence of Sanitation on the Age-"incidence of Zymotic Mortality." This presents another aspect of the comparison already instituted in Table XIV between Liverpool and the "healthy districts" of the Registrar-General, and is extracted from the elaborate tables given on pp. 29, 112, 128, of the Supplement to his Thirty-fifth Report. These tables give the expected mortality from various causes per million born alive, under each of the contrasted circumstances, and at each age-period. From these tables have been ascertained—

(1.) For each disease, and under each circumstance respectively, the total expected mortality per million born alive, at all ages.
(2.) The same for ages under 5.
(3.) The percentage which such mortality under 5 bears to such total mortality; *i.e.*, the children's share of the total expected mortality from each disease, under each circumstance respectively.

These last percentages, for Liverpool and the "healthy dis-"tricts," are recorded in Cols. 11 and 12 of my Table XIV. And the difference between these two columns will give the difference in the children's share due to the difference in the mode of life. And the diagram shows this difference at a glance. For the amount of the children's share in Liverpool is shown by the *whole* shaded area for each disease, in percentages, each smaller square counting for 1 per cent. The extent of the similar children's share for the "healthy districts" is shown in the light shading. Therefore the black area shows the excess of the children's share in Liverpool above the similar share in "healthy districts." And

thus the black area becomes a measure of the extent to which sanitation can influence the children's share of expected mortality.

On this method small-pox is compared with seven other zymotics separately; then with the remaining diseases of the zymotic group; and lastly, with all the diseases of that group in sum. And the conclusion is that, judged by the extent of the influence of sanitary circumstance on the distribution of the expected mortality amongst the age-periods under and over 5 years—

Small-Pox shows an amenability to Sanitary Interference greater than that of any other Zymotic save only Diarrhœa.

Thus the statement so often made that sanitation can preserve from typhoid but is useless against small-pox is wrong in every respect, but peculiarly wrong in respect of age-incidence. In an unhealthy district the children's share of the small-pox mortality, taking Liverpool as an example, will run to 63·5 per cent.; in healthy districts that share is only 25·5 per cent.; and the difference, 38 per cent., measures the influence exerted by sanitation on the age-incidence of the disease. And this figure, 38·0, is larger than the corresponding figure for any other disease, save only the 40·4 for diarrhœa.

It may possibly be objected that, when comparing the figures for small-pox in recent quinquennia with similar figures for other diseases, the greater change is shown to belong to those others, whereas the comparison between Liverpool and "Healthy "Districts" shows the greater change as occurring in small-pox; and that there is here an apparent discrepancy which requires explaining. I conceive that the explanation, so far as any is needed, lies in the fact that there is of necessity a kind of "Diminishing Return" in the reduction of the children's share of a zymotic mortality, and that while, so long as any small-pox is left there will probably always be a children's share thereof, there is no reason to despair of the reduction of the all-age small-pox mortality to zero. That, therefore, comparing the large figures of Liverpool with the smaller returns for "Healthy Districts," the contrast between the shares would naturally come out much greater than the similar contrast in the children's shares of the much smaller mortality of the last few quinquennia.

VIII.—*Sex-Incidence.*

Another element in the controversy as to whether the incidence of small-pox is or is not a matter of vaccination as distinguished from sanitation, is its incidence on the two sexes.

There can be no doubt that re-vaccination is preponderatingly

incident on the male sex. Amongst the causes of this preponderance we may reckon:—

1. The services;
2. Life assurance.

Of these,

(1.) The army and the navy both insist on vaccination or re-vaccination in England. And in Germany, the army vaccination law of 16th June, 1834, combined with the conscription, practically insured a most rigorous vaccination, with no less than ten insertions in each arm, for the whole of the able-bodied adult males in that country. (*Cf.* the Second Report of the Commission, *Q.* 6967, *et seq.*)

And the civil service is another energetic vaccinating agency, incident in vast majority on males. And these influences tend towards the re-vaccination of *young adults.*

(2.) *Life assurance* applies in great preponderance to the heads of families, the male bread-winners. And I am assured on the high authority of Mr. G. F. Simons, who was for something like forty years in the service of the National Provident Life Assurance Association, and retired not long ago from the position of its chief clerk, that at least forty-nine males take out policies of life assurance for one female.

Now infantile vaccination, on the other hand, is applied, under the pressure of the compulsory law, to both sexes alike.

Hence, if vaccination be the arbiter of small-pox incidence, we shall expect to find an equality in respect of small-pox at early ages, which equality will give place amongst adults to a considerable preponderance of small-pox amongst females, the lesser vaccination of these latter leaving them more exposed than the more highly protected males.

But the facts are just the other way. From the Supplement to the Forty-fifth Report of the Registrar-General, pp. cxii and cxiii, I extract the accompanying Table XXVIII of the incidence of small-pox on the two sexes at various age-periods, and for the three decennia 1851-60, 1861-70, and 1871-80.

TABLE XXVIII.—*Annual Mortality from Small-Pox and from Fever (Typhus, Typhoid, and Continued) per Million Living at all Ages and at Twelve Groups of Ages, among Males and Females, in Three Decennia.*

[From Supplement to Forty-fifth Report of Registrar-General, pp. cxii and cxiii.]

Age-Period.	Decade...	Small-Pox.			Fever.		
		1851-60.	1861-70.	1871-80.	1851-60.	1861-70.	1871-80.
All.....	Males.....	242	182	267	907	896	494
	Females....	202	145	207	909	875	477
0—	Males.....	1,047	661	538	1,401	1,230	644
	Females....	1,021	648	516	1,434	1,266	658
5—	Males.....	271	150	301	937	881	486
	Females....	243	140	267	1,077	966	550
10—	Males.....	70	56	136	687	622	390
	Females....	76	56	139	878	798	487
15—	Males.....	105	91	206	858	787	513
	Females....	81	80	189	1,026	911	573
20—	Males.....	174	181	377	850	823	579
	Females ...	91	95	230	781	722	445
25—	Males.....	119	136	300	673	704	436
	Females....	68	70	183	627	641	387
35—	Males.....	69	98	211	649	793	395
	Females....	37	50	128	597	706	362
45—	Males.....	53	68	145	779	903	437
	Females....	23	32	81	647	784	369
55—	Males.....	34	48	86	1,043	1,159	503
	Females....	14	25	58	888	959	418
65—	Males.....	27	38	61	1,563	1,469	629
	Females....	10	15	34	1,276	1,151	488
75	Males.....	20	30	48	1,709	1,494	593
	Females....	10	15	26	1,413	1,203	425

In this table, therefore, the figures are given for three decades, and for the sake of comparison and contrast, the similar figures are given for the great fever group, that is, for typhus, typhoid, and simple continued fever. In each decade the results, though dealing with very different quantities, remain practically the same so far as the comparison of sex-incidence is concerned. In each decade, up to the age of 15, the figures show a very slight preponderance of male over female small-pox mortality. So far the influence of vaccination has been applied to both sexes alike; and both sexes appear to suffer from small-pox, if not to an identical degree, yet to degrees separated by so small a difference that they may well be treated as identical. But from and after the age of

15 this remarkable similarity in the figures for the two sexes ceases. So much so, that for some age-periods, such as that between 35 and 44 years, the incidence of small-pox on males is just about twice as severe as the corresponding incidence in the case of the other sex. The fevers also show preponderance of male over female mortality, for this same period, but a much slighter preponderance than is the case with small-pox.

It would thus appear obvious that the incidence of small-pox is a question of the exposure to the infection, and not a question of vaccination or the want of it. So long as the opportunities of exposure to the infection remain for both sexes practically alike, as during infancy and school age they undoubtedly do, so long also the incidence of the disease remains pretty much the same for both. But as soon as an age is reached at which the more stay-at-home habits of the females tend to diminish the opportunities of infection as compared with those of the males who go more abroad, so soon also do the females begin to contribute far less than an equal share to the small-pox mortality. And the fact of the greater vaccination of the male sex taken as a whole is of no avail whatever as a counteracting agency. More exposure means more small-pox, and less exposure means less small-pox, no matter what the vaccinal conditions. Wherefore it follows that to remove small-pox we ought rather to remove chances of infection than have recourse to vaccination. In other words, where vaccination fails isolation and sanitation will suffice.

To render this point of sex-incidence still clearer, if possible, I have constructed the accompanying diagram, showing the sex-incidence of the small pox mortality from 1854 to 1887. The materials are to be found in the table of such incidence at various ages, given in the fifty-first Report of the Registrar-General, p. xxi.

In this diagram the curve for the *male* death-rate from small-pox is drawn in a continuous line; that for the corresponding *female* rate in a dotted line. Hence whenever the continuous line in the diagram lies above the dotted, there is recorded an excess of male over female mortality, the amount of such excess being represented by the vertical distance between the two curves. It will be seen that, with a single exception, the continuous curve lies in the upper position throughout the whole of its course through the various age-periods. That exception concerns the ages between 10 and 15; but the difference between the 80 females and the 76 males is hardly of noticeable importance. At the ages from 20 years and upwards the males have an incidence of small-pox mortality which approaches to double the corresponding figures for females.

From the experience of Germany we can obtain striking confirmation of these observations on sex-incidence. Here we have to deal with a much more certain and ascertainable amount of young adult revaccination. It is of course a mere historical commonplace that the citizen army, co-extensive with the healthy adult male population, dates in Prussia from the Treaty of Tilsit in 1807. To evade the provisions of that treaty, by which the Prussian army was limited to 43,000 men, the device was hit upon of combining universal conscription with short service, whereby every male not incapacitated by ill health had to serve his time with the colours. The connection of this fact with the present controversy is due to the vaccination law of 1834, whereby every recruit was vaccinated or re-vaccinated with ten insertions of lymph in each arm. It is often contended that there was no law in Germany for compulsory revaccination prior to 1875. If so, then the military, that is to say the male adult, population would be distinguished from the civil, or female, adult population by the vastly greater extent and thoroughness of their revaccination. But again we find that in Germany also the adult males have more small-pox, and more fatal small-pox, than the females of similar age. The statistics on this point are not very full. But there would appear to be enough to establish at all events the absence of any female pre-eminence amongst the German small-pox of the great pandemic. For instance, in respect of Bavaria, to which the above principles apply fully, it was given in evidence before the Commission (Second Report, Table K, p. 238) that of the total Bavarian small-pox deaths in 1871-72 no less than 52 per cent. were males. Nor has it ever, so far as I am aware, been observed that small-pox in Germany has shown, either in the incidence of its attack or by its actual mortality, any marked preference for the female portion of the adult population. Yet such preference should have been shown to a very marked degree indeed if the conscriptional army vaccination and re-vaccination of Germany were to produce a result in the least degree commensurate with its thoroughness and its wide diffusion.

Thus, so far as we have the opportunity to observe the facts, it appears as a rule that the greater risks of infection appertaining to the male sex result in a greater actuality of small-pox, and that the greater vaccination of the males is powerless to destroy their pre-eminence in the incidence of the disease. The conclusion would thus appear hardly avoidable that the right way to contend against small-pox is by measures such as general sanitation in the broad sense above attached to the term, and isolation, which operate by diminution of the chances of infection, rather than by vaccination.

IX.—*Variation by Localities.*

Of this almost endlessly many-sided question there is now but one other aspect to which I can refer, the absence of local quantitative concomitance between the decline of small-pox and the advance of vaccination. To this allusion has already been made in a general sense; but I believe the investigation can be rendered more precise by aid of some returns given in the Medical Officer's Supplement to the Twenty-second and Twenty-third Reports of the Local Government Board, wherein is set forth a comparative view of the incidence of small-pox and some other zymotics in eighty-one such towns under notification, being the eighty-one such towns for which the Registrar-General publishes quarterly returns of mortality. Observing the wide variation and capricious incidence of small-pox in these places, I have endeavoured to compare the facts as to the incidence of small-pox upon them with the amount of their default under the Vaccination Acts for the last ten years, the small-pox figures referring only to the two years recorded in the table referred to, the years 1892-93. Selecting all the places where the total of small-pox cases exceeded 100 for the two years in question, and all the places where the similar total was less than 5, the small-pox incidence of attack per 10,000 of population, the small-pox incidence of mortality per 10,000 of the population, and the fatality of small-pox per cent. of cases were all calculated from the table referred to. The percentage of "children not "finally accounted for, including cases postponed," was then taken out for each year, 1882-91, and the average of such percentage default calculated for each of the places under consideration. These results are collected in Table XXIX.

This done, the places with much and the places with little small-pox were next treated separately, in Tables XXX and XXXI, where the names are arranged in the order of the incidence of attack on the respective populations. It will at once be seen that the column for vaccinal default is of quite irregular arrangement. In Table XXX, Warrington, with only 5·24 of default, is at the top of the list, Sheffield, with about the same default, is at the bottom, while Leicester, with the highest default of all, is below the middle. The same result shows in Table XXXI, where the total of small-pox is very small, and where Eastbourne, with a very high default, is absolutely free from small-pox, and where Hartlepool, the highest for small-pox, has almost the lowest default of all. So that it would appear that, be the total of small-pox incident on a locality large or small, such incidence is entirely independent of the vaccinal condition of such locality.

This view it is endeavoured to further enforce in Table XXXII.

Here the localities treated are arranged in four ways, in accordance with (1) the attack rate, (2) the mortality rate, (3) the fatality, and (4) the vaccinal default. It is submitted that if the vaccinal condition were the only determining cause of the observed variolous phenomena, or even if it were a predominently influencing cause, there would be found a close correspondence, approaching to identity, in these four arrangements. But the truth is the reverse of this. Warrington, which heads the list both for attack and mortality, and for fatality ranks very high, is as low in vaccinal default as Hartlepool, which has neither mortality nor fatality to be reckoned. And so throughout the table. There is no approach to quantitative concomitance to be found between the arrangements of the fourth column and that of the first three.

X.—*Conclusion.*

I have here confined myself to the issues which in my opinion concern the question of the maintenance, amendment, or abolition of the present vaccination law. I have endeavoured to show that statistical inquiry breaks down at every point the claims originally urged on its behalf. Other claims set up of later years in favour of the operation as a mitigator or temporary postponing agency as against small-pox are in my view no less false than these I have endeavoured to meet, and my statistical grounds for that conclusion would be, on some other occasion, very much at the service of this Society, should any care to hear. But claiming no infallibility on the question itself—holding that the claim to statistical infallibility is infallibly the claim of a statistical quack, I yet submit with some confidence that a case, *even if mistaken*, which can be supported as I have tried to support it, and by others far more powerfully than by me, is one which should be met, and one which, whether we like it or not, will sooner or later have to be met, by weapons quite other than those of the criminal law. To have argued thus before the Royal Statistical Society may indeed have been an error, but it is an evil thing for England that it should also be a crime.

TABLE XXIX.—*The Small-Pox and Vaccinal Condition Compared for the*

[From the "Medical Officer's Supplements to the

Year.	Locality.	Population in 1891.
"Children not finally Accounted for (including Cases Postponed) per Cent. of Births," for Ten Years 1882-91.	Eastbourne	34,969
	Southampton	65,325
	Colchester	35,559
	Norwich	100,970
	Bristol	221,578
	Gloucester	39,444
	Walsall	71,789
	Birmingham	478,113
	Aston Manor	68,639
	Leicester	174,624
	Liverpool	517,980
	Warrington	52,743
	Salford	198,139
	Manchester	505,368
	Oldham	131,463
	Preston	107,578
	Halifax	89,832
	Bradford	216,361
	Wakefield	33,146
	Sheffield	324,243
	Middlesbrough	75,532
	Darlington	38,060
	Hartlepool	21,271
	Merthyr Tydfil	58,080

Average	1882	'83	'84	'85	'86	'87	'88	'89	1890	'91
32·17	8·3	11·5	13·2	24·1	23·8	33·2	21·4	54·4	65·1	65·8
8·78	7·4	8·5	8·2	7·1	7·7	6·6	10·2	10·5	10·6	11·0
8·44	6·2	7·2	7·2	5·6	7·6	6·9	7·3	12·0	11·1	11·1
11·02	5·0	6·1	4·5	5·3	5·2	6·9	5·6	11·7	18·8	41·1
5·87	4·9	5·7	4·0	4·4	5·1	4·3	5·5	8·3	8·7	7·8
37·08	4·0	6·9	9·5	10·6	18·1	58·8	20·5	83·2	83·2	84·7
10·31	3·4	4·4	6·4	6·2	14·3	12·7	11·0	13·0	13·5	19·2
4·44	1·3	1·5	2·4	4·3	4·6	5·5	4·9	5·8	5·8	8·3
8·30	7·0	6·1	5·5	6·8	7·6	7·2	8·7	9·1	10·1	13·5
63·07	30·2	43·8	47·9	52·1	69·1	77·0	79·8	78·7	79·9	
4·51	4·5	3·8	4·3	4·7	4·8	5·7	4·5	4·3	4·4	4·1
5·24	7·8	8·1	6·3	4·3	3·6	4·1	6·4	6·0	5·1	4·0
9·00	5·9	6·3	6·4	7·4	7·9	9·5	10·6	11·0	12·1	12·9
3·88	3·6	3·8	3·6	3·5	4·1	3·5	3·9	4·4	4·9	3·5
42·12	13·4	15·5	17·2	18·4	27·6	44·1	60·9	71·0	74·4	78·7
7·03	5·6	6·4	6·8	7·9	6·4	8·2	4·9	10·9	8·5	11·1
33·43	4·7	7·7	9·8	11·6	13·0	28·9	44·8	60·0	69·6	74·9
12·26	5·1	4·9	6·1	7·1	8·0	10·5	14·0	20·6	24·3	22·0
4·00	3·6	3·1	3·4	3·7	3·9	3·0	4·3	5·1	4·6	5·3
4·86	5·1	5·3	4·6	4·3	3·4	2·8	3·5	5·3	5·1	6·9
3·39	3·2	3·5	2·7	3·0	2·1	2·6	4·0	3·9	4·1	4·8
8·52	4·5	4·2	4·1	4·4	4·6	5·4	4·5	10·5	17·0	26·0
5·52	4·4	4·4	4·8	3·7	3·7	4·7	4·3	11·2	8·3	5·7
2·66	2·0	2·0	1·7	2·5	2·4	2·1	3·6	4·0	4·3	

Years 1892 *and* 1893 *of Twenty-Four Localities under Notification.*

Reports of the Local Government Board."]

Cases Notified, 1892-93.	Attack Rate per 10,000.	Deaths.	Mortality per 10,000.	Fatality per Cent.	Average Annual Default of Vaccination per Cent. of Births, 1882-91.
0	—	0	—	—	32·17
164	25·1	10	1·5	6·0	8·78
0	—	0	—	—	8·44
3	0·3	0	—	0	11·02
169	7·6	17	0·7	10·0	5·87
3	0·7	0	—	0	37·08
768	106·9	67	9·3	8·7	10·31
1,021	21·3	71	1·4	6·9	4·44
126	18·3	1	0·1	0·7	8·30
320	18·3	21	1·2	6·5	63·07
252	4·8	22	0·4	8·7	4·51
636	120·5	73	13·8	11·4	5·24
186	9·3	23	1·1	12·3	9·00
741	14·6	50	0·9	6·7	3·88
490	37·2	79	5·0	16·1	42·12
3	0·2	0	—	0	7·68
500	55·6	52	5·7	10·4	32·43
1,024	47·3	119	5·5	11·6	12·26
364	109·8	33	9·9	9·0	4·00
145	4·4	13	0·4	8·9	4·86
112	14·8	9	1·1	8·0	3·39
3	0·7	0	—	0	8·52
3	1·4	0	—	0	5·52
1	0·1	0	—	0	2·66

TABLE XXX.—*Small-Pox and Vaccination—Default compared by Localities.*

(a.) *Districts with more than* 100 *cases in* 1892-93.

District.	Population in 1891.	Cases Notified, 1892-93.	Attack Rate per 10,000.	Deaths.	Mortality per 10,000.	Fatality per Cent.	Average Annual Default of Vaccination per Cent. of Births, 1882-91.
Warrington	52,743	636	120·5	73	13·8	11·4	5·24
Wakefield	33,146	364	109·8	33	9·9	9·0	4·00
Walsall	71,789	768	106·9	67	9·3	8·7	10·31
Halifax	89,832	500	55·6	52	5·7	10·4	32·43
Bradford.....	216,361	1,024	47·3	119	5·5	11·6	12·26
Oldham	131,463	490	37·2	79	5·0	16·1	42·12
Southampton	65,325	164	25·1	10	1·5	6·0	8·78
Birmingham	478,113	1,021	21·3	71	1·4	6·9	4·44
Aston Manor	68,639	126	18·3	1	0·1	0·7	8·30
Leicester.....	174,624	320	18·3	21	1·2	6·5	63·07
Middlesbrough	75,532	112	14·8	9	1·1	8·0	3·39
Manchester.....	505,368	741	14·6	50	0 9	6·7	3·88
Salford.....	198,139	186	9·3	23	1·1	12·3	9·00
Bristol.....	221,578	169	7·6	17	0·7	10·0	5·87
Liverpool	517,980	252	4·8	22	0·4	8·7	4·51
Sheffield	324,243	145	4·4	13	0·4	8·9	4·86

TABLE XXXI.—*Small-Pox and Vaccination—Default compared by Localities.*

(b.) *Districts with less than* 5 *cases in* 1892-93.

District.	Population in 1891.	Cases Notified, 1892-93.	Attack Rate per 10,000.	Deaths.	Mortality per 10,000.	Fatality per Cent.	Average Annual Default of Vaccination per Cent. of Births, 1882-91.
Hartlepool	21,271	3	1·4	0	—	0	5·52
Darlington	38,060	3	0·7	0	—	0	8·52
Gloucester	39,444	3	0·7	0	—	0	37 08
Norwich	100,970	3	0·3	0	—	0	11·02
Preston	107,578	3	0·2	0	—	0	7·68
Merthyr Tydfil	58,080	1	0·1	0	—	0	2·66
Colchester	35,559	0	—	0	—	—	8·44
Eastbourne.....	34,969	0	—	0	—	—	32·17

TABLE XXXII.—*All the Localities Dealt with in Tables XXIX—XXXI.*

Arranged in order of

Attack Rate per 10,000.	Mortality per 10,000.	Fatality per Cent. of Cases.	Vaccinal Default per Cent. of Births.
Warrington	Warrington	Oldham	Leicester
Wakefield	Wakefield	Salford	Oldham
Walsall	Walsall	Bradford	Gloucester
Halifax	Oldham	Warrington	Halifax
Bradford	Halifax	Halifax	Eastbourne
Oldham	Bradford	Bristol	Bradford
Southampton	Southampton	Wakefield	Norwich
Birmingham	Birmingham	Sheffield	Walsall
Aston Manor	Leicester	Walsall	Salford
Leicester	Salford	Liverpool	Southampton
Middlesbrough	Middlesbrough	Middlesbrough	Darlington
Manchester	Manchester	Birmingham	Colchester
Salford	Bristol	Manchester	Aston Manor
Bristol	Liverpool	Leicester	Preston
Liverpool	Sheffield	Southampton	Bristol
Sheffield	Aston Manor	Aston Manor	Hartlepool
Hartlepool	None	None	Warrington
Darlington			Sheffield
Gloucester			Liverpool
Norwich			Birmingham
Preston			Wakefield
Merthyr Tydfil			Manchester
Eastbourne			Middlesbrough
Colchester			Merthyr Tydfil

Discussion *on* Mr. Milnes's Paper.

Mr. Noel Humphreys said that he was much surprised that the author had carefully avoided all but the most incidental reference to the remarkable epidemic of small-pox in Gloucester, and he doubted whether the subject of the paper could be statistically treated with success without such reference. Mr. Milnes did not profess to cover the whole statistical ground, but it should be noted that he had not referred to the Small-pox Hospital statistics, which showed a marked contrast between the mortality of vaccinated and unvaccinated cases, or to the remarkable difference in the type of disease between vaccinated and unvaccinated cases. Neither had he referred to the efficiency of re-vaccination in providing comparatively absolute protection to nurses and doctors in small-pox hospitals. With regard to the statistics dealt with in the paper, the following criticisms suggested themselves: the author sought to make a point, and to draw a lesson from the assertion that "vaccination and small-pox attained their maximum together, and together they have steadily declined." Now that statement was not only inaccurate but it was misleading. The amount of default of infant vaccination referred to would have to be maintained for a large number of years before it would materially affect the proportional vaccination of the whole population. It was impossible to discuss in detail Mr. Milnes's comparison between the rates of mortality of different diseases; but he could not help demurring to Mr. Milnes's contention that the decline of small-pox could not be due to vaccination because fever and cholera had declined concurrently with small-pox. Fever and cholera were acknowledged to be mainly caused by insanitary local conditions, but it could not be urged that small-pox was caused by foul drains or bad water. Mr. Milnes had blamed the Registrar-General for not publishing statistics of vaccination which he did not possess, and which the law did not require to be recorded. No one regretted more than he himself, from a statistical point of view, that this information was not given more generally, and he should welcome any change in the law which would promote this result. Mr. Milnes also complained that there was no column in the Registrar-General's reports for re-vaccinated cases of fatal small-pox; but he need hardly say that if such cases occurred, which was doubtful, they were not so certified in the death register. With reference to the assertion that small-pox mortality was governed by sanitation rather than by vaccination, the author in the latter part of the paper admitted that small-pox prevalence and fatality was really a question of exposure, but he evidently did not see the bearing of this admission from a statistical point of view with regard to the relative mortality from small-pox in healthy districts and in Liverpool. No doubt it was in great

measure a question of exposure, and the residents in a seaport town like Liverpool were exposed to many times greater risk than those living in the rural districts chosen to represent the healthy districts. The same remarks applied to the comparison between the proportional small-pox mortality in the urban and rural districts of Scotland.

With regard to a table which the author had done him the honour to extract from a paper which he (Mr. Humphreys) had recently submitted to this Society, it was constructed for the purpose of showing that there was a constant relation between the proportion of child mortality from small-pox and the default of infant vaccination. Mr. Milnes, with the assistance of his friend Mr. Alexander Paul, had laboured very industriously to discredit the obvious lesson taught by this table, and had arrived at the conclusion that the higher proportion of children's deaths in Leicester was due to the high proportion of children attacked. This was probably a trustworthy conclusion, and one that was equally trustworthy as an explanation of the high proportion of child mortality in Gloucester. Mr. Milnes and his friend, however, did not assign any more satisfactory explanation of the large proportion of children attacked by small-pox in Leicester and Gloucester than the recent neglect of infant vaccination.

With regard to the author's inferences from the sex-incidence of small-pox, it appeared to him that the assertion that there could be no doubt that re-vaccination was preponderatingly incident upon the male sex was a gratuitous one. It was true that re-vaccination was compulsory in the case of soldiers, but there was ground for believing that the evidence of doctors would show that the re-vaccination of females exceeded that of males, and that females had not the same objection to re-vaccination often shown by males. No doubt the question of exposure to infection was an important one, and as males were more liable to exposure than females in common lodging houses and elsewhere, this might account for the higher rate of mortality from small-pox among males than among females.

Dr. Walter Hadwen said he belonged to Gloucester, and had gone into the question of the epidemic at that place very carefully. The whole question could be settled by looking at the map which the Medical Officer of Health for the city had recently published in his report, from which it would be noted that small-pox was practically restricted to the southern half of Gloucester. As regarded the question of unvaccinated children and what relation that bore to this geographical fact, the Medical Officer of Health declared at the commencement of the epidemic there were 12,000 unvaccinated children under 10 years of age in the city. Of that number there were some 700 cases of small-pox, and of these only 23 were vaccinated. At that time of course they were all practically unvaccinated. When however the number of unvaccinated children was reckoned with the number of vaccinated children to the balance of all children, and it was remembered that for the past ten years there had been 96 per cent. of vaccination default,

it worked out that practically the vaccinated and the unvaccinated children had had an equal small-pox attack rate. Further, he begged to call in question the accuracy of the Medical Officer of Health's statistics. When their own statistics were brought out, which they would be shortly, it would be seen that the vaccinated children of Gloucester had suffered more than the unvaccinated. Of the total 1,980 cases of small-pox of all ages said to have occurred in the city, 1,172 were officially acknowledged to have been vaccinated. Another point was this: they had been told that sanitation had no effect upon the disease, but seeing that the small-pox in Gloucester was restricted to the southern part of the city, and bearing in mind that all Gloucester was equally unvaccinated, it certainly looked as if there must be some cause other than vaccination which could have affected the result. Throughout the whole of south Gloucester there had been complaints for years with regard to its sanitary condition. In two streets, Alma Place and Terrace and New Street, an eighth part of all the small-pox cases in Gloucester were situated. The houses in these streets had only four small rooms in them, and the sanitary conditions were simply shocking, the drainage and water supply being scandalously defective. He had no doubt that the epidemic was caused by these conditions. To show that such was the case, they had the fact that the city surveyor had petitioned that throughout the length of the Barton district, where the small-pox cases largely occurred, the old sewer should be taken up and replaced by a new one laid at a lower level in order that there might be a better fall for the side streets. With regard to the mortality amongst children, it was certainly largely due to the shocking neglect which took place in the hospital. Two, three, and four children were placed in a bed together; instead of 2,000 or 3,000 cubic feet of air per patient, they were reduced to 600 or 700; they had no water applied to their bodies or even faces whilst confined to bed, in many cases for weeks, and there was an utter absence of treatment in every shape and form. Out of 429 deaths in Gloucester, 200 occurred in the hospital; this was practically half the small-pox mortality. In the hospital this number of deaths occurred out of only 730 cases received as compared with 1,250 odd cases outside. To show what the condition of the treatment was, he might mention that there were a couple of what were called "quacks" who treated patients: one by ointment only, and the other by water treatment, and from well authenticated cases it appeared that one had about 10 per cent. of deaths and the other only 2 per cent. He had obtained the names and addresses of the whole of these cases. The total death-rate including the latter had reached the enormous total of 26·3 per cent. Excepting the fatality under the insanitary conditions of the old London Small-Pox Hospital, to which only the worst cases were admitted, this was the highest small-pox death-rate on authentic record.

Mr. Shirley Murphy said the first point that interested him was the proportion of vaccinated and unvaccinated persons admitted into the London hospitals. Mr. Milnes was of opinion that those proportions were practically what they were in the

outside population, and he drew his deductions from the statistics of the Highgate Small-Pox Hospital. This would not be a fair sample of the London population, for the reason that the Highgate Hospital did not receive children under 7 years of age; and secondly, it drew its patients from a different class of population from that of the other small-pox hospitals of London. If he wished to draw conclusions from hospital statistics, he would rather take the proportions of unvaccinated to vaccinated in the hospitals of the Metropolitan Asylums Board. He found that in 1890-95 there were 4,839 cases admitted into the hospital ships, of which 68·1 per cent. were vaccinated. If with the vaccinated cases were included all those with reference to which no information could be given as to the state of vaccination, it raised the proportion to 77·4 per cent. Mr. Milnes would probably argue that this number approached his figure of 80 per cent., which he considered as the proportion of vaccinated in the population. He (Mr. Murphy) was not able to agree with that, though, without discussing the point further, he would ask, why not draw your inference from what was taking place among the young children of the population? During the same period 789 children under 10 years of age were admitted into the hospitals, of which 15·5 per cent. were vaccinated. If among the vaccinated were included those as to whom there was no evidence as to vaccination, this percentage was raised to 20·5. Could any one assume that these figures represented the proportion of the vaccinated under 10 years of age in the London population? With regard to vaccination in the Prussian army, the facts appeared to be taken from a book which he (Mr. Murphy) held in his hand. But Mr. Milnes must at the same time have seen in this book the diagram which related to what took place in the French and Austrian armies, and was given for the purposes of contrast. That diagram represented that the deaths from small-pox in the Prussian army had disappeared, whereas it had continued to a later date in the Austrian and the French armies. He thought that when statistics were presented to a society like the Statistical, this fact should not have been omitted. Referring to the large proportion of deaths from small-pox concerning which there was no statement as to vaccination, he agreed with Mr. Milnes that it was important to have the facts as to vaccination, whichever way they might tell, plainly put before the country. He pointed out that in London a large number of deaths occurred in hospitals, where the cases were under more accurate observation, so that the proportions of vaccinated and unvaccinated deaths could be better ascertained. He found, taking fifteen years from 1881 to 1895, that whereas in the whole country 56·4 per cent. of the deaths were included under the heading "no statement," in London the proportion was only 35·4 per cent. He had applied the London proportions of "vaccinated," "unvaccinated," and "no statement" deaths to the deaths from small-pox in the country generally, and found that if the proportions had been the same for the whole country as in London, 3,351 deaths under the heading "no statement" would have to be distributed among the vaccinated and unvaccinated in

the following proportions: 1,460 would go to the vaccinated, and 1,891 to the unvaccinated. He could not read into the omission to state on the death certificate the condition as to vaccination, the desire not to state the facts, but if they were stated they would probably range themselves very much in the proportions stated. In London, on this point, they had fuller statistics than those of the Registrar-General. The fact that small-pox cases were usually sent to the hospital ships, enabled a more exact statement to be made as to the condition of vaccination than if the people remained in their own homes. The deaths in the Asylums Board Hospitals fell into the following proportions: Of the vaccinated at all ages 25·9 per cent., of the unvaccinated 53·6, and of the no evidence 20·5. This had reference to deaths that occurred in the period 1891-95. Dealing with those under 5 years of age, the Registrar-General in his report had given for the same period 7·2 deaths among the vaccinated, 80·8 among the unvaccinated, and 12 per cent. "no statement." But when he (Mr. Murphy) examined the Asylums Board returns, he found that out of 120 deaths under 5 years of age, in only two instances was there no evidence as to vaccination, the whole of the remaining 118 being unvaccinated children. One might go a step further and take the deaths under 1 year of age. In the same period, as shown by the Registrar-General's reports, there were 51 deaths at this age in London. These were divided into 5·9 vaccinated, 78·4 unvaccinated, and 15·7 no statement. Then turning to the Asylums Board Returns, he found that of 43 deaths occurring in the Asylums Board Hospital, all were unvaccinated. He was sorry that time did not permit him to touch upon other important matters.

Mr. G. U. Yule said that the criticisms he wished to make were of a much more general character than those brought forward by most of the previous speakers. Owing partly to the method adopted, partly to the insufficiency of the statistics, the cases that Mr. Milnes adduced to show that there was no relation between vaccinal default and small-pox, were equally incapable of exhibiting any relation between "sanitation" (or anything else) and small-pox. The discussion was in fact futile.

Consider the question of method. Mr. Milnes himself argued that small-pox rates were a function of a great variety of causes, that he grouped under the general term "sanitation" (in a much extended sense). If, then, it were desired to investigate the effect of varying rates of vaccination, the variations of sanitation should first be allowed for, and the *residual* differences in small-pox rates observed. In the case of ordinary death-rates, for example, correction had to be made for age and sex-distribution before using the rates for comparative purposes, *e.g.*, by reducing the rates to the basis of a "standard population." Similarly Mr. Milnes should have reduced his rates to the basis of a "standard sanitation" for the purpose of studying the effects of vaccination, and *vice versâ*, or have got over the difficulty in some equivalent manner. In not a single case was this attempted; the

author had entirely failed to grasp the situation implied in his own arguments.

Take the question of sex-incidence (Table XXVIII of the paper). Assuming Mr. Milnes's statements on the greater prevalence of re-vaccination among males to be correct, it did not follow in the least, as he stated, that male mortality above the age of re-vaccination should be less than female. The ratio between the two would depend on the value of the ratio in the entire absence of re-vaccination. This was unknown; but if there was more re-vaccination among males in the last period (1871-80) as compared with the first (1851-60), all that might be expected would be a decrease in the ratio of male to female mortality above, say, the age-group 10—15. This was precisely what had happened, as evidenced by the following table deduced from Mr. Milnes's by working out the ratios. The sex-ratio had decreased in the last column, as compared with the first or second, at every age-group without exception from 15—20 upwards. No similar change had occurred in the fever figures, which were given for comparison :—

TABLE I.—*Ratio of Male to Female Small-Pox and Fever Mortality—Female taken as* 100.

Age Period.	Small-Pox.			Fever.		
	1851-60.	1861-70.	1871-80.	1851-60.	1861-70.	1871-80.
All	120	126	129	100	102	97
0.....	103	102	104	98	97	102
5.....	112	107	113	87	91	88
10.....	92	100	98	78	78	80
15.....	130	114	109	84	86	89
20.....	191	191	164	109	114	130
25.....	175	194	164	107	110	113
35.....	187	196	165	109	112	109
45.....	231	214	179	120	115	118
55.....	243	192	148	118	121	120
65.....	270	253	180	123	127	129
75.....	200	200	185	121	124	145

Again, take the discussion of incidence on various localities. Tables (Nos. XXX, XXXI) were there given of only 16 sanitary districts in which more than 100 cases of small-pox occurred during the two years 1892-93, and of only 8 in which fewer than five cases occurred, with particulars of small-pox attack-rate, mortality, and vaccinal default. To these tables he (Mr. Yule) had added a fourth column giving the percentage of the population living two or more to a room, estimating these "overcrowding" figures from the data obtained by the census of 1891. This "overcrowding" might be called a measure of "sanitation" in Mr. Milnes's much generalised sense—and a most important measure, it might be imagined, in the case of a highly contagious disease like small-pox. The whole of Mr. Milnes's paragraph on his tables

could, however, be re-written on Table II below with a slight alteration—the substitution of "sanitation" or "overcrowding" all the way through for "vaccinal default."

TABLE II.—*Small-Pox in various Localities.*

(*Tables XXX and XXXI of the paper, with columns of Overcrowding added.*)

Sanitary District (Urban).	Attack Rate per 10,000, 1892-93.	Mortality per 10,000, 1892-93.	Average Annual Default of Vaccination per Cent. of Births, 1882-91.	Overcrowding (per Cent. of Population Living Two or more to a Room).
(Table XXX.)				
Warrington	120·5	13·8	5·24	11·71
Wakefield	109·8	9·9	4·00	27·92
Walsall	106·9	9·3	10·31	15·83
Halifax	55·6	5·7	32·43	31·06
Bradford	47·3	5·5	12·26	25·23
Oldham	37·2	5·0	42·12	17·71
Southampton	25·1	1·5	8·78	6·86
Birmingham	21·3	1·4	4·44	21·99
Aston Manor	18·3	0·1	8·30	12·96
Leicester	18·3	1·2	63·07	4·33
Middlesbrough	14·8	1·1	3·39	27·53
Manchester	14·6	0·9	3·88	14·49
Salford	9·3	1·1	9·00	15·35
Bristol	7·6	0·7	5·87	14·09
Liverpool	4·8	0·4	4·51	17·63
Sheffield	4·4	0·4	4·86	18·67
(Table XXXI.)				
Hartlepool	1·4	—	5·82	43·29
Darlington	0·7	—	8·52	25·62
Gloucester	0·7	—	37·08	7·47
Norwich	0·3	—	11·02	8·30
Preston	0·2	—	7·68	8·08
Merthyr Tydvil	0·1	—	2·66	22·24
Colchester	—	—	8·44	5·71
Eastbourne	—	—	32·17	6·81

"It would at once be seen that the column for sanitation was of quite irregular arrangement. In Table XXX, Warrington, with overcrowding 12 per cent., was at the top of the list; Sheffield with 19 per cent. was at the bottom; Leicester, with far the lowest overcrowding of all, was near the middle. The same result was shown in Table XXXI, where Gloucester, with 7·5 per cent. of overcrowding, had no less attack-rate than Darlington with 26 per cent. So that it would appear that be the total of small-pox incident on a locality, large or small, such incidence was entirely independent of the sanitary condition of such locality."

Now Mr. Milnes's words and his (Mr. Yule's) stood on exactly the same footing. They were both sound statistical arguments or they were both sheer nonsense. Of course both arguments were

baseless. You could not take vaccination alone or sanitation alone, in the first place, but must consider both together by some method more effective than looking down a list; and in the second place the material handled was much too small. Two years (1892-93) were an absurdly short period on which to average the rates for a rare and sporadic disease like small-pox—the rates were in no way representative of the localities—and 16 towns were far too small a group on which to base conclusions.

Precisely the same kind of fallacy occurred in Table VI, where a list of the numbers of deaths in three successive epidemics (1858, 1864, and 1871) was given, and the great increase in mortality seriously pointed out as evidence of the insufficiency of vaccination.

But would Mr. Milnes maintain that there was a great decrease in "sanitation" between the first epidemic and the last? If not, the figures could no more be held to prove the inefficacy of vaccination than they could be held to disprove the value of sanitation.

Again, in the paragraphs round Tables XXIII—XXVI, Mr. Milnes argued that the large percentage of children's deaths in the list of six towns given was no evidence of severity of epidemic or of danger caused by lack of vaccination. He subsequently concluded, from figures referring to Scotland, that "It appears clearly the more generally healthy the conditions of the districts the smaller is the children's share of the mortality." He (Mr. Yule) could not agree that this "appeared clearly" from the figures given, but taking it for granted, he naturally tried to apply it in part explanation of the phenomena in five of the six towns, omitting London, which could hardly be treated as a single district. The figures were as follows, using overcrowding again as a measure of sanitation:—

TABLE III.

	Percentage of Children's Attacks on Total.	Percentage of Children's Deaths on Total.	Overcrowding (Percentage of Population Living Two or more to a Room).	Percentage Default, 1882-91.
Warrington	9·83	22·58	11·7	5·24
Sheffield	12·42	25·60	18·7	4·85
Dewsbury	21·64	51·82	42·0	?
Gloucester.....	35·67	64·52	7·5	37·08
Leicester	30·53	71·43 or 66·60	4·3	63·07

The result seemed scarcely satisfactory for Mr. Milnes's theory, Gloucester and Leicester had far and away the lowest overcrowding of the whole list.

As he (Mr. Yule) had stated at the beginning of his remarks, Mr. Milnes's figures, as he gave them, frequently did not exhibit any clear relation between small-pox rates and vaccination, but neither did they exhibit any clear relation between small-pox and anything else. Method and statistics were merely incapable of elucidating anything whatever.

There was a curious lapse on Mr. Milnes's part on p. 567 Speaking in September, 1896, Lord Lister remarked that small-pox

was then "absolutely unknown in the huge German army." To confute this statement, Mr. Milnes triumphantly brought forward statistics that stopped short at 1887, *i.e.*, nearly a decade before the time to which the statement referred.

Dr. E. J. Edwards said that as reference had been made to the German army, he might perhaps be permitted to make one further reference. The statistics gave only one death in the German army in twenty years, and it must not be forgotten that in all Germany, with a very large population, which had re-vaccination by the law of 1874, the deaths per million had remained fairly stationary, and at a minimum. There was only one country in Europe till recently which had been properly vaccinated, and that was Germany. Now Italy too had a good vaccination law since 1888, and the results obtained therefrom were already very gratifying. The deaths per 100,000 living in 284 chief communes during ten years 1881-90 averaged 35 each year, but during four years 1891-94 averaged only 6 each year.

There was a remarkable diminution in number after the Act had been applied a few years. He thought it was high time that the medical profession in this country recognised the fact that no country could be called a well vaccinated country which had only primary vaccination; more men and women died in such a country from small-pox than before vaccination was discovered.

Mr. Alfred Milnes in reply regretted that there had not been time in which to properly criticise his paper, or to allow of his replying to such criticism as had been made. As it was, he would only ask the indulgence of the Members for a reply on two points. He had been asked why he had not dealt with the subject of Gloucester. He felt that that was a subject which could best be dealt with by Dr. Hadwen, who knew Gloucester thoroughly, and he thought the short statement which that gentleman had given would fully explain the state of the case. The real reason why he did not treat of Gloucester in the paper was, to put it frankly, that neither side could trust the other as to the figures connected with Gloucester. He did not believe one word of the teaching which claimed to rest on certain figures which had been quoted upon the subject of Gloucester, simply because he had been there and knew what the state of sanitation was. And secondly, when he was blamed for not taking up the question of the Austrian, Prussian, and German armies, he might remind them that the date of compulsory vaccination in the Prussian army was 1834 and not 1872. The law of compulsory vaccination in Germany, or rather in Prussia, for the whole population dated from 1835, as was apparent from the law, still existing in print, and of which he had a copy. Nor must it be forgotten that the Austrian armies were close to the confines of those countries of south-eastern Europe, where insanitation prevailed to the most horrible extent. The whole question of small-pox or no small-pox was one of exposure and not a question of vaccination at all.

School Hygiene, *in its* Mental, Moral, *and* Physical Aspects.

(Howard Medal Prize Essay.)

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School hygiene embraces all that makes in school for a balanced mind and a healthy body. Schools as we know them are of modern growth. The civilisations of the ancient world did not require a complex training for children.

In Scotland, since 1696, the heritors of every parish have been legally bound to provide a public school, but in England, apart from a restricted provision by the founders of grammar schools, and by pious benefactors of endowments "for the promotion of "godliness and good learning," there was no public provision for elementary education until this century.

The question of schooling for poor children seems to have arisen incidentally. Legislation regarding poor children begins with Elizabeth (1601), and the scandals arising out of the poor law apprentice system called for legislation from 1747 onwards. Children of tender years were prohibited from chimney sweeping in 1788, and in 1792 prosecution was ordered for masters who ill-treated their employees, but not a word was said as to education.

The Factory Acts begin from 1802, to prevent overwork, to

provide comparatively healthy surroundings, and, indirectly at first, to provide for elementary education. From 1833 children under 13 years of age who were workers had to spend two hours daily in school, and in 1844 this was raised to three hours.

The enactment of 1792 preventing children under 8 years from chimney sweeping was followed, in 1819, by fixing 9 as the lowest limit of age for work; this has been raised under the Factory (Health of Women, &c.) Act, 1874, to 10, and again under the Elementary Education (School Attendance) Act, 1893, to 11; and the Department, in the Blue Book, hopes, "That as years go on, "and public opinion ripens as to the importance of sufficient edu- "cation, and the mischief of early child labour, it may be found "possible to raise still further the minimum age of exemption." This was proposed to be fixed at 12 in the late Education Bill (1896), and in time may probably reach a limit of 14 years.

In 1816 a Committee of the Commons concluded "that a very "large number of poor children were without means of instruc- "tion," and asserted that their education was a vital matter for the State.

In 1833 came the Treasury minute authorising the expenditure of 20,000*l.* annually in grants to school building. In 1839 this was raised to 30,000*l.*, and an Order in Council of April 10th appointed the Committee of Council on Education. Inspectors were appointed, chiefly clergymen until 1870, when the State ceased to inspect on religious knowledge. "I must confess I feel "thankful for this arrangement. . . . I feel obliged reluctantly to "confess that religious knowledge in the schools under my inspec- "tion is year by year growing less." Report of H.M.I., Rev. W. H. Bellairs, 1870.

In 1849 a portion of the grant was given to the newly established training colleges, then and still denominational.

In 1870 came the great step in Mr. Forster's Education Act, which first appointed school boards, and through them has led to far reaching development of popular education. It was extended in 1873 to include the children of out-door paupers, and in 1876 came what might almost be called the "Magna Charta" of childhood: "It shall be the duty of the parent of every child to "cause such child to receive efficient elementary instruction in "reading, writing, and arithmetic." (39 and 40 Vict., cap. 79, sec. 48.) The same Act provides that children, defined as from 5—14 years of age, shall be restricted from employment except on satisfying certain conditions as regards education and age, leaves a loophole for industrious but slow-witted children in an attendance qualification, and empowers the establishment of day industrial schools by an order of the Secretary of State.

In1880 attendance was made compulsory; in 1891 education became free by the institution of the fee grant, and in 1893 legislation compelled the special education of the blind and deaf, and in the same year raised the age of exemption to 11, under which age work is not permitted, although the Poor Law Commission, sec. 217, reports still that children are employed in some workhouses "as half-timers at the tender age of 8."

Provision for Education.

The ground is completely covered by—

I. Private venture schools.

II. Endowed, primary and secondary, and many proprietary schools.

III. State Schools.

a. Public elementary schools under the Education Department.

b. Science and Art schools under the Science and Art Department.

c. Poor Law schools, and "certified schools" under the Local Government Board.

d. Industrial and reformatory schools under the Home Office.

I. The private adventure schools are quite free from legislative control, and therefore no statistics regarding them can be obtained. Probably there are from 12,000 to 20,000 in the country. In evidence before the Secondary Education Commission, representatives of 584 associated private schools, mostly in the south of England, said that these schools, with an attendance of 18,604 pupils, had an average of 48·6 in girls and 58·6 in boys' schools, and excluding visiting or outside teachers, one teacher to 9·2 girls, and one to 13·7 boys, or an average of 1 to 11 pupils. With regard to sanitary improvements they were unwilling to have any inspection by the local authorities. Such schools may be useful in a very few cases of delicate children, but as they are quite uncontrolled at present, may be good, bad, or absolutely dangerous, from a hygienic point of view, with impunity. In towns many are regarded as mere "covers" to avoid real compliance with the attendance requirements of the Acts, and such schools should not be permitted except under licence from the Education Department.

II. The endowed primary and secondary schools, both day and boarding, from the most ancient foundations, like the residential colleges of Winchester (1387) or Eton (1441), or now flourishing day schools like St. Paul's (1509) or the Manchester Grammar School (1515), down to the most recently established girls' grammar schools, need not be further considered here.

III. The State Schools.

(*a.*) *The elementary schools* are those of the greatest importance, nearly a fifth of the total population using them from day to day. They are divided in the official returns into board schools and voluntary schools.

The board schools established under the Act of 1870 are maintained out of the school board rates and the parliamentary grants; they are all undenominational.

The voluntary schools are now State denominational schools; they are maintained by special parliamentary grants and by voluntary subscriptions, and managed by representatives of the particular religious body whose doctrines are taught in them.

(*b.*) The schools and classes under the Science and Art Department need not be separately considered.

(*c.*) *The Poor Law Schools* are under the Local Government Board; they developed from workhouse schools by the Poor Law Amendment Act of 1844, giving power to the commissioners to combine unions into school districts for the education of the children up to the age of 16.

"Certified schools" are denominational voluntary schools, certified by the Local Government Board for the reception of poor law children, some only taking special classes, blind, deaf, or crippled.

The proposed Act of 1896 would have placed these schools under inspection by the Education Department, and thereby raised the tone and standards all round.

(*d.*) *Reformatory and industrial schools* are under the Home Office, and of great importance as supplements to the elementary schools. In 1894 there were under inspection 50 reformatory, 141 industrial, 14 truant, and 22 day industrial schools. The reformatories established in 1853 were penal, and stigmatized even the smallest child as a criminal for life; this led to the industrial schools being started in 1857. To the reformatories may go children sentenced for offences punishable with penal servitude, but minor offenders, not convicted of felony, and children not under proper control, may be sent to the industrial schools.

There were in 1894 in industrial schools:—

	Protestant.	Catholic.	Total.
Boys	8,524	2,329	10,853
Girls	2,172	1,010	3,182
Boys and girls	10,696	3,339	14,035

Truant schools were established under the Act of 1876. Children admitted to them are on good behaviour allowed out on license after an average stay of three months. Up to December, 1894, 20,771 had been admitted, of whom 11,262 had been licensed out and not readmitted, whilst 5,059 had been recommitted once, and 3,446 twice or oftener.

The day industrial schools are very few in number. Their great value has not been appreciated yet in the large towns, where they would aid and supplement school attendance in the worst cases, and more particularly in the cases of verminous or dirty children.

The law compels attendance at school of children between the ages of 5 and 14 years. The only State schools are the public elementary schools, and the question of hygiene in these schools is the one we will chiefly concern ourselves with. Six-sevenths of the total population at school age are estimated by the Education Department as " of the class usually found in elementary schools.

School Ages.

The Department estimates that there might be on the rolls one-fifth of the total population, and that school places must be provided for one-sixth. In this districts vary much, owing to differences in the age distribution of the population, but the relative child population is decreasing owing to the lowered birth-rate of recent years. The percentage of the population living in England and Wales in the age groups 0—5 and 5—10 was in 1881 13·6 and 12·1, and had fallen in 1891 to 12·3 and 11·7 respectively. Custom and habit have also a great deal to do with the proportion attending school. The age recognised for beginning school attendance is 3, compulsion after 5. In many of the European countries this last age is fixed at 7 or 8. This possibly is a detail of comparative unimportance, because whether a class begins at 3 or 5 makes all the difference at the end of two or four years in the work done as measured by the standards of the code, yet it is doubtful whether any real educational difference would result whether 3, 5, or 7 were fixed as the beginning of school life. The home surroundings and life are of infinitely greater importance at these ages than any school. A child before 7 or 8 is scarcely capable of learning in the same sense that it does after that age, as its nervous system is not yet fully developed.

Comparing school ages and attendance in England and Scotland, we have as an example the numbers over 10 years of age in Standard I:—

Standard I.	Total Number.	5—10.	10—	Percentage over 10.
Edinburgh schools	3,626	2,978	648	Per cnt. 18·0
Bradford „	3,462	3,408	54	1·6

In Scotland too the age for school attendance is being postponed; this is well shown by the Edinburgh returns:—

Date.....	1889-90.	1890-91.	1891-92.	1892-93.	1893-94.	1894-95.
Percentage of Edinburgh children over 9 years old in Standard I	about 16·0	—	—	41·0	45·8	47·9

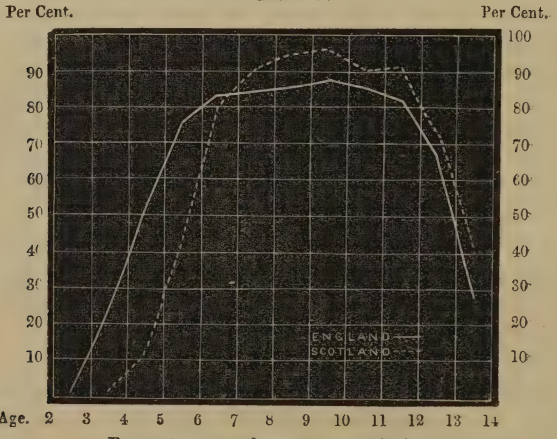
Taking the percentage of registration to population at each age, we have, for 1894:—

Ages.....	2—	3—	4—	5—	6—	7—	8—	9—	10—	11—	12—	13—
England and Wales	0·5	22·4	51·7	74·8	83·0	83·9	84·7	86·5	84·9	81·5	66·8	27·7
Scotland	0·0	1·4	11·3	42·7	80·0	91·6	94·4	95·4	89·4	90·9	71·8	40·6

The registration and estimated populations being given in the "Education Reports, 1894-95," Scotland, xxxii and 315, and for England, p. 780.

These figures are represented on Diagram I.

DIAGRAM I.



Percentage enrolment to population.

If the percentage of registration in Roman Catholic Schools to all the schools be taken, the numbers are:—

		Under 5.	Over 5.	Total.
England	Total	530,790	4,705,097	5,235,887
	Roman Catholic schools	33,055	244,689	277,744
Scotland	Total	12,928	686,788	699,716
	Roman Catholic schools	2,719	53,561	56,280

The percentages of registration in Roman Catholic Schools to total in schools was in 1894:—

	Under 5.	Over 5.	Total.
England	6·2	5·2	5·3
Scotland	21·0	7·7	8·0

So that a really much smaller percentage of Scotch children are sent to school at infant ages than at first appears, because the Roman Catholic children are not of Scotch parentage. Although so few attend before 7 years of age, the Royal Commission of 1886 reports (Final Report, Commission on Elementary Education, p. 308), "we find that out of 381,000 children above 7 years of "age in average attendance, nearly 100,000 passes in specific "subjects were recorded; in England out of 2,464,000 above "7 years of age, 56,341 specific passes were recorded; had the "same number of passes proportionately been obtained in England "as in Scotland, there would have been 640,000 passes instead "of 56,341."

The comparison of the proportion of child population on the registers up to 7 years emphasises home influence; above 7 at every age there is a greater percentage of the population at school in Scotland than in England; but below 7 we find, in 1894, the percentages of enrolment to population at each age to be:—

Ages.....	2—3.	3—4.	4—5.	5—6.	6—7.
England and Wales	0·5	22·4	51·7	74·8	83·0
Scotland	0·0	1·4	11·3	42·7	80·0

Scotland being a poorer country, there is less education out of the public schools, but long before the present authorities held sway, the late Dr. Farr, in 1862, remarks, "all the women of the county "of Kinross who married wrote their names in the registers; the

"proportions per cent. were also 98 in Peebles, 98 in Kincardine, "96 in Roxburgh, 96 in Kirkcudbright, 94 in Perth, 92 in Fife, "91 in Edinburgh, and 93 in the far off Orkneys." "In the "general struggle for the church property at the Reformation, "the people had the good sense to endow the school masters with "small stipends, and not to give the whole revenue of the land "either to the clergy or to the nobility. In common education "the great body of the people of England are many degrees below "the people of Scotland, and it is impossible to calculate the "advantage this superiority gives the Scotchman over the English-"man at home or abroad." (Twenty-seventh Annual Report, Registrar-General, xvii.) This is one cause of the pronounced home influence, which Farr also pointed out as showing in the infantile death-rates ("Vital Statistics," p. 191). Deaths under 1 year of age per 1,000 born (1873-75):—

1873-75.	All Causes.	Measles.	Scarlatina.	Diarrhœa.	Convulsions.	Suffocation.
England	152·7	2·2	1·4	17·1	25·1	1·4
Scotland	125·7	2·2	1·9	7·0	5·5	0·9

"The deaths from diarrhœa depend upon social conditions "which influence the feeding of children. In Scotland these con-"ditions do not operate to nearly the same extent as in England. "The sanitary conditions of Scotland are not so perfect as to "account for the difference, the explanation depends upon the "better care for the children at home which exists in Scotland." (Dr. H. R. Jones, *Journal of the Royal Statistical Society*, 1893).

The influence of the home appears great, the direct effect of the school on national health is small, but its indirect effect through the home is very great.

Home influence and training are so powerful, that where they are opposed to the schooling, the latter is almost wasted energy. "The "school proposes, the slum disposes." The School Board in a Memorial to the Commissioner of the House on the Glasgow Police Act, "are convinced that little improvement will be made in the "character and condition of a very large number of children so "long as they are housed and environed as at present. The Board "are bound to find the most comfortable and sanitary school "premises, with ten square feet of space for each child, separation "of the sexes, latrines, lavatories, and play grounds, with every "appliance for their well-being. Does it not seem a mockery to "make this ample provision for six to eight hours of the child's "school day, with the knowledge that many of them are returning "to wretched homes, which have no title to the name, and where

"habits of cleanliness, decency and morality can scarcely be main-
"tained? It is the experience of the Board that to a large extent
"the surroundings and social circumstances of thousands of chil-
"dren are the main causes of the truancy, irregularity, vagrancy,
"and juvenile delinquency which the Board have so much reason
"to deplore."

Aggregation.

The accumulation of large numbers of children has certain effects from mere aggregation, as Dr. Sykes, of St. Pancras, says: "In proportion to the increase of size of an institution, so should "the precautions to prevent the spread of disease be increased; "and there is no doubt that in large institutions there is a point "at which the precautions become so complicated and so extensive "as to outweigh the advantages of exceeding a certain limit of "size." (Poor Law School Commission Report, section 66.)

In the Poor Law Schools this effect of aggregation becomes very manifest, there is want of exercise to both brain and muscle, with a resulting deterioration of vitality, due to this want of exercise and to impure air, and in spite of being well fed and warmly clothed, infectious diseases find such children an easy prey.

Death-Rates at School Ages.—School influence in the contagious diseases at once suggests itself; this influence may be of two kinds; it may withdraw children from dangers, on the other hand it may draw them into dangers; it may be possible to find out these effects by examining the records of the Registrar-General. In 1870 there was an average attendance of 1,150,000, in 1894 it had become 4,225,000. The effect of the increased school attendance since 1870 has been to take many boys from work to school, and many girls from home to school.

Taking the Registrar-General's groups of ages 0—5, 5—10, 10—15, 15—20 as before, during, and beyond school life, there should be an increasing tendency to equalising the death-rates of the two sexes at school ages.

Death-Rates, England and Wales. (Registrar-General.)

Age Groups.	All Ages.		5—10.		10—15.		15—20.		20—25.	
Sexes.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1861–65	23·7	21·5	8·5	8·3	4·7	4·8	6·4	6·9	8·7	8·2
'66–70	23·7	21·2	7·9	7·4	4·3	4·3	6·0	6·4	8·3	7·8
'71–75	23·3	20·7	7·1	6·6	4·0	4·0	5·7	5·9	8·1	7·4
'76–80	22·1	19·5	6·3	5·9	3·4	3·5	4·9	5·0	6·7	6·2
'81–85	20·5	18·3	5·8	5·7	3·2	3·3	4·5	4·7	6·0	5·9
'86–90	20·0	17·8	4·9	4·9	2·8	2·9	4·1	4·1	5·5	5·2
'91–94	19·8	17·7	4·6	4·6	2·6	2·7	4·0	4·0	5·4	4·8

Calling male death-rates 100, then female death-rates in the different age groups at various periods are, for England and Wales :—

Age Groups.	All Ages.	5—10.	10—15.	15—20.	20—25.
1861–65	90·7	97·6	102·1	107·8	94·2
'66–70	89·4	93·6	100·0	106·6	94·0
'71–75	88·8	92·9	100·0	103·4	91·3
'76–80	88·2	93·6	102·9	102·0	92 5
'81–85	89·2	98·3	103·1	104·4	98·3
'86–90	89·0	100·0	103·5	100·0	94·5
'91–94	88·8	100·0	106·7	100·0	88·8

The death-rate among females, as compared with males, remains fairly steady, but apparently since the establishment of general school attendance the death-rates amongst girls, especially in the later years of school life, are greater than amongst boys.

Accidents and Violence.—In some cases the school may act as a shelter, thus in the second half of school life we would expect that, with increased attendance at school, deaths from accidents would have actually decreased amongst boys, being withdrawn from work, and relatively to a greater extent than amongst girls, withdrawn from home.

Deaths per 100,000 *Living at each Age, from Accidents, &c., England and Wales.*

Age Groups.	0—		5—		10—		15—		20—	
Sexes.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1851–60	145	114	64	43	77	16	86	16	95	12
'61–70	148	116	60	32	76	13	86	15	102	12
'71–80	135	108	53	24	60	11	76	13	93	11
'81–90	127	102	45	20	43	9	60	12	69	11
'91–94	135	114	41	21	37	8	53	8	57	7

The female death-rate, being least likely to be influenced by school attendance, may be taken as 100 at each age and period, and the male death-rates then will be :—

Male Death-Rates (*Females* = 100) *from Accident.*

	0—	5—	10—	15—	20—
1851–60	130	149	481	537	791
'61–70	128	187	584	573	850
'71–80	125	220	546	584	845
'81–90	124	225	477	500	630
'91–94	119	195	462	662	814

The school effect, increasing with the numbers in attendance, since 1870 shows itself markedly at the ages 10—15.

If any effect is seen in disease, it should be in the case of the zymotics; the school effects would be either a very great increase in the death-rates of boys and girls at school ages, or else, if home effects are more powerful, then as girls are being withdrawn into school, and from home and contact with the sick during the busy part of the day, girls' death-rates at school ages should be reduced, and in a greater ratio than boys.

Measles and whooping cough are the most fatal of infantile contagious diseases. Their effects are chiefly seen in infant departments; out of these departments the material is comparatively sterile. The death-rates per million living in England and Wales are :—

Measles, Death-Rates.

England and Wales.	0—		5—		10—		15—	
Measles.	M.	F.	M.	F.	M.	F.	M.	F.
1851-60	2,847	2,749	262	288	32	44	11	15
'61-70	3,067	2,929	230	254	26	32	9	13
'71-80	2,642	2,494	196	217	32	22	5	8
'81-90	3,271	2,992	262	280	19	26	6	8

Expressing the male death-rates as 100, we have female death-rates from measles—

	0—	5—	10—	15—
1851-60	96	109	137	136
'61-70	95	110	123	144
'71-80	94	111	69	160
'81-90	91	107	137	133

For whooping cough the rates are :—

England and Wales.	0—		5—		10—		15—	
Whooping Cough.	M.	F.	M.	F.	M.	F.	M.	F.
1851-60	3,246	4,003	133	215	6	14	1	2
'61-70	3,394	4,139	123	182	5	11	1	3
'71-80	3,309	3,994	112	157	4	8	1	1
'81-90	3,066	3,672	100	155	3	5	1	2

And putting all male rates as 100, we get the female rates as—

	0—	5—	10—	15—
1851–60.....	123	163	233	—
'61–70.....	122	148	220	—
'71–80.....	120	140	200	—
'81–90.....	119	155	166	—

Obviously in these two diseases there is no increase from school effect, if anything there is a decrease in both boys and girls at school ages, and in girls relatively to boys.

In the diseases scarlatina and diphtheria prophylactic measures may almost mask any good or evil "school effect." The death-rates recorded are—

Death-Rates from Scarlatina.

England and Wales.	0—		5—		10—		15—	
Scarlatina.	M.	F.	M.	F.	M.	F.	M.	F.
1851–60	4,311	4,071	1,984	1,999	461	528	146	154
'61–70	4,745	4,503	2,220	2,144	468	534	149	157
'71–80	3,591	3,387	1,554	1,475	318	330	107	101
'81–90	1,712	1,627	758	765	148	158	43	40
'91–94	3,916	3,748	1,684	1,712	356	409	181	147

and in the cases of diphtheria the records show—

England and Wales.	0—		5—		10—		15—	
Diphtheria.	M.	F.	M.	F.	M.	F.	M.	F.
1851–60	431	430	228	280	85	124	39	144
'61–70	757	778	338	448	107	166	58	61
'71–80	472	473	256	325	72	105	28	38
'81–90	688	693	373	474	84	115	35	37
'91–94	1,237	1,202	534	686	104	137	34	54

Putting the male death-rates, as 100, we have for scarlatina, female death-rates—

Scarlatina.	0—	5—	10—	15—
1851–60.....	92	101	114	105
'61–70.....	94	96	114	105
'71–80.....	94	95	101	94
'81–90.....	95	100	106	93
'91–94.....	96	102	114	81

and similarly for diphtheria, female rates—

Diphtheria.	0—	5—	10—	15—
1851–60.....	100	123	146	113
'61–70.....	103	132	155	105
'71–80.....	100	127	146	136
'81–90.....	100	127	137	106
'91–94.....	97	128	131	159

There is no obvious bad effect, but rather a good protective effect shown from school attendance here.

Small-Pox we would expect to differ from the other zymotics in this way, that previously it would generally be introduced into a house by the males, and that the females could then be protected by re-vaccination. Now the females are more exposed to external influences, and likely to contract it before being protected; and so we find—

England and Wales.	0—		5—		10—		15—	
Small-Pox.	M.	F.	M.	F.	M.	F.	M.	F.
1851–60	1,047	1,021	271	243	70	76	105	81
'61–70	661	648	150	140	56	56	91	81
'71–80	538	516	301	267	136	139	206	189
'81–90	82	77	35	30	25	27	42	40
'91–94	505	521	105	125	51	67	92	91

and putting male rates as 100, we get for female rates from small-pox—

Small-Pox.	0—	5—	10—	15—
1851–60.....	97	90	108	77
'61–70.....	98	93	100	88
'71–80.....	96	88	100	91
'81–90.....	94	86	108	95
'91–94.....	103	119	145	97

Phthisis.—In the case of phthisis the death-rates are—

England and Wales.	0—		5—		10—		15—	
Phthisis.	M.	F.	M.	F.	M.	F.	M.	F.
1851–60	1,329	1,281	525	620	763	1,293	2,399	3,516
'61–70	990	947	431	477	605	1,045	2,190	3,112
'71–80	783	750	340	375	481	846	1,675	2,397
'81–90	553	518	253	327	342	699	1,287	1,800

and putting male rates again as 100, we get for female death-rates—

Phthisis.	0—	5—	10—	15—
1851–60.....	96	118	170	146
'61–70.....	96	110	172	142
'71–80.....	96	110	176	143
'81–90.....	94	129	204	140

Obviously girls at school ages have some influence acting more and more to produce fatal phthisis. Can it be the atmosphere of school, so much fouler than that of their own homes?

So far as the death-rate at school ages show, increasing school attendance does not act harmfully. In the case of deaths from violence the effect is manifest as a decreased rate, and so too with the zymotics, except small-pox. In the case of phthisis there appears an increased death-rate associated with increased school attendance.

Effects of Notification of Disease and Closure.

With regard to the notifiable infectious diseases, it is generally the rule for the sanitary authorities to intimate either through the educational authorities or directly, all cases of infectious diseases occurring in children in the public schools or in the families of such children. From this cause it has to be kept in mind that in a large town there are at all times many children of school age to be found in the streets during school hours who are kept out of school by the action of the sanitary authorities.

The general question of school closure for disease has been summed by Dr. Thorne Thorne: "In sparsely populated rural "districts, where the children of different households or of separate "hamlets rarely meet except at or on their way to the village "school, the closing of the school is likely to be effectual in "checking the spread of the disease. It is less likely to be useful "in a town or compact village."

Holiday Effects.—The effects of school closure and attendance have been studied from the notifications of scarlatina and diphtheria by the medical officer of health for London. A remission in the number of notified cases was remarked to coincide with the holiday season.

In 1892 the summer holiday began in the London board schools on 21st July, towards the end of the twenty-ninth week of the year, and terminated in the beginning of the thirty-fourth week, so that, allowing a week for incubation and notification, the thirty-first to thirty-fourth weeks should show any holiday

influence. Taking three periods of four weeks, before, during, and after the holidays, there was noted for scarlatina :—

	Under 3.	3—13.	Over 13.
Increase or decrease per cent. of number of notifications in second period (31st to 34th week) in comparison with first period (27th to 30th week)	+25	− 9	+ 9
Increase per cent. in number of cases of third period (35th to 38th week) compared with second period	Nil	+52	+15

In 1893 for the corresponding periods the proportions were .—

	Under 3.	3—13.	Over 13.
Percentage increase or decrease, second period over first	−3	−26	−17
Percentage, third period over second	+9	+65	+26

In 1894 there were in London only half the number of cases of scarlatina (18,495 against 36,849) that occurred in 1893, the case rate being :—

	1891.	1892.	1893.	1894.
Number of cases per 1,000 notified in London as scarlatina	2·7	6·4	8·6	4·2

Showing some "epidemic influence" at work.

On dividing out as in previous years :—

London.	Scarlatina Cases notified.			Increase or Decrease per Cent. over previous Period.		
1894.	0—3.	3—13.	13—	0—3	3—13	13—
Four weeks preceding holiday period	204	1,026	220	....	....	....
Four weeks of holiday period	189	808	181	− 7·4	− 21·2	− 17·7
Four weeks succeeding holiday period	176	1,079	175	− 6·9	+ 33·5	− 3·3

There was a decrease, but as regards the school holidays "the "decrease began two weeks earlier and was continued one week "later than would be explicable on this hypothesis alone."

Diphtheria.—In the case of diphtheria there has been a slow progressive increase for many years, both before and since any school effects could have come into action. The diphtheria

mortality reached its highest in 1893, since which time it appears steadily decreasing :—

Diphtheria Death-Rates.	England and Wales.	London.
1861–70	185	176
'71–80	121	122
'81–90	163	260
'91–95	252	543

These are given analysed into age groups in the report of the medical officer of health for London, 1893.

England and Wales. Death-Rates from Diphtheria.

	All Ages.	2—3.	3—4.	4—5.	5—10.	10—15.	15—20.
1855-60	178	706	776	723	414	172	68
'61-70	184	803	832	736	393	136	59
'71-80	121	483	580	547	291	88	33
'81-90	163	773	896	848	424	100	36

In other figures, all ages being taken as 100.

	All Ages.	2—	3—	4—	5—	10—	15—
1855-60	100	397	436	406	233	97	38
'61-70	100	436	452	400	214	74	32
'71-80	100	399	479	452	240	73	27
'81-90	100	474	550	520	260	61	22

The percentage rise or fall therefore being—

1861-70	+ 3	+14	+ 7	+ 2	− 5	−21	−30
'71-80	−32	−40	−30	−26	−26	−35	−44
'81-90	+35	+60	+54	+55	+46	+14	+ 9

And if in the period 1881-90 we estimate the incidence of diphtheria in the different age groups, the case mortality in London at the different age groups being taken as a rough approximation, we get for diphtheria in England and Wales, 1881-90 :—

	2—3.	3—4.	4—5.	5—10.	10—15.
Percentage rise or fall of diphtheria death-rates over preceding decennium	+60	+54	+55	+46	+14
Death-rates per million	773	896	848	424	100
Roughly estimated percentage case mortality	48	45	37	22	6
Estimated incidence of diphtheria cases per million	1,610	1,991	2,292	1,927	1,666
Percentage of population on rolls of elementary schools, 1894	0·5	22·0	52·0	82·0	54·0

If school attendance had any great share in determining the incidence of diphtheria, there should be a correspondence between the two last lines of the table, which there is not.

In London (1892-95) Dr. Smith showed that the number of children attacked at various ages bore no proportion to the number at school :—

	0—1.	1—2.	2—3.	3—	4—	5—	6—	7—	8—	9—
Average roll London board schools, 1892-95	—	—	403	13,072	30,069	46,624	53,460	55,823	53,572	54,338
Annual notifications, London, diphtheria, 1892-95	220	608	771	982	952	890	749	563	430	357

Also in his report to the London School Board he writes :—" The " period of greatest liability then begins before the real school age " is reached. In general the rates in the group of ages 3—6 are " markedly higher than those at the ages on either side of this " group. There are, however, several exceptions to this rule ; thus " in Bethnal Green, Greenwich, and Poplar, the period of special " liability begins at 2 years of age, and in St. George's-in-the- " East and in Whitechapel yet a year earlier. In Whitechapel it " stops short at 5 years of age ; while in Hackney, Islington, " Kensington, Paddington, Poplar, and St. Pancras it extends to " 7, and in Fulham to 8 years of age. It will be seen at once " that those districts in which the special liability at the age " 1 or at the age of 2, contain some of the poorest and most " crowded sections of the population of London. This fact strongly " indicates *the conditions of home life* as a much more potent factor " in the spread of the disease than aggregation in schools."

Taking the diphtheria figures for the same periods as the scarlatina returns already dealt with, the Medical Officer of Health for London shows :—

London Diphtheria Cases Notified.	1892.			1893.			1894.		
	0—3.	3—13.	13—	0—3.	3—13.	13—	0—3.	3—13.	13—
Percentage increase or decrease in holiday period over preceding month	+20	− 3	−10	+8	−27	+ 1	+11	−24	+ 4
Percentage increase or decrease succeeding month over the holiday month	− 7	+29	+34	+6	+81	+33	−10	+44	+11

When other towns in England are similarly compared, the evidence is negative as to school influence. Taking Manchester, Salford, Oldham, Liverpool, Sheffield, Newcastle, and Birmingham, we can analyse the notifications of diphtheria as follows :—

Diphtheria. Notifications.	Weeks before Holidays.				Holiday Period.					Weeks after Holidays.			
	4	3	2	1	1	2	3	4	5	1	2	3	4
3-week holidays (17 school years)	36	43	48	36	39	40	43	—	—	28	41	61	35
4-week holidays (10 school years)	96	65	72	102	62	75	72	58	—	57	76	74	67
5-week holidays (8 school years)	22	28	21	22	25	16	27	19	29	20	20	46	16
Average weekly	4·4	3·9	4·0	4·6	3·6	3·7	4·0	3·0	4·0	3·0	4·0	5·0	3·0

No one could read these figures as offering any support to the theory of school diffusion of diphtheria, and the figures for Berlin for the same period tell also in the contrary direction :—

Berlin.	Weeks before.				Holiday Period.				After Holidays.			
Diphtheria	—	3	2	1	1	2	3	4	1	2	3	—
Average number weekly notifications.....	—	20	19	13	17	19	20	13	11	22	19	—

If other holidays, Easter or Christmas, be taken, there is no trace of an effect, and it may be taken that there is no evidence for England and Wales that school attendance is any considerable factor in disseminating diphtheria, but that in London a school effect can be demonstrated in the holiday depression in the curve of weekly returns; the effect is, however, small compared with home influences in the poorest parts of London, and more evident in the better class districts.

A study of the incidence on the two sexes should show a much greater fall from "holiday influence" amongst boys than amongst girls if school attendance is a considerable factor. It is possible in the case of diphtheria that the dual desks which are so generally used in London may have something to do with its diffusion, and the provision of hygienic single seats would be a prophylactic if the diphtheria rate remains high.

Other Contagions.—Skin diseases and the infectious ophthalmia so prevalent in Poor Law schools are the results of home influences.

Ringworm does not give rise to any trouble in day schools. In Bradford it is not held to be an excuse for non-attendance. Children affected wear their caps and attend. *Impetigo contagiosum* will be found prevalent occasionally in a class, or, as we have seen it, throughout a small national school in a country village. A good account of an outbreak of contagious eczema at Newcastle Street School, Shoreditch, was published in 1885 by Dr. Saville, it was purely school contagion.

Of the dirt infections lice probably is commonest. It is difficult to determine exactly how much is the result of school and how much home effect. The short-haired boys scarcely suffer; short-haired girls about the same. Taking the children all round, below the fourth standard in several Bradford board schools, there were visible nits above the ears in 1 in 4 long-haired girls, and only 1 in 10 short-haired, and many of the short-haired had had their hair cut on account of the breaking out associated with the parasites.

In such atmospheres, with smoke and dirt, as town children live, long hair should be discouraged, short hair being the only condition that can be maintained cleanly with reasonable care.

School Organisation.—The class is the school unit. Its size is of great importance; as large as 100 on the continent, classes of 60 to 70 are not uncommon even in the best board schools. That is too high. Mr. Sharpe suggested 40, but the minority report of the Education Commission put 60 as the maximum. New board schools are now generally built with class rooms for 56 seats. The size of the class is rising slowly.

$\frac{\text{Average attendance}}{\text{Number of teachers}} =$	1870.	1874.	1876.	1891.	1892	1893.	1894.
	41	35	34	38	39	40	40

In the case of infant classes a much larger number is permissible, but in the standards a maximum allowable for each room should be settled, or otherwise from bad management, or want of power to classify, a school is not infrequently found with class rooms for 56, but one room will have over 70, whilst the next has under 50 in it.

It is better if school departments do not exceed 500 in average attendance. Although in cost of maintenance, in ventilation and so forth, there is a gain in schools two or three times as large, yet in such the best result of school life, *esprit de corps*, is generally wanting. The large school is too often a soulless machine.

All schools must satisfy the requirements of the code. Its

Schedule VII requires a playground of a quarter of an acre to every 250 children, a minimum of 30 square feet per child, with separate playgrounds in mixed schools. There has been some opposition to this requirement in towns, the very places where it is most necessary.

Suitable building and drainage regulations are laid down. Separate entrances for each department, with doors opening either way; cloak rooms, which are generally too deficient, "lavatory "basins are needed," a minimum number should be ordered 1 to 75 children, and 1 to 50 infants, and to each basin a towel, not one to half a dozen basins and as many hundred children as is common at present.

Warming and Ventilation are also provided for at considerable length in the code. *This is the most urgent and pressing question at present in school hygiene*, and as regards schools this is the most difficult question in ventilation. In addition, the difficulties of the English climate have to be remembered.

The Houses of Parliament have only been satisfactorily ventilated after years of experiment and at enormous cost. Schools have to be ventilated and warmed efficiently and cheaply. The problem is, given a large class of children in a confined space—I have seen 109 "6-year olds" sitting on a gallery measuring 20 feet × 11 feet—how to keep the air warm, change it completely every quarter of an hour, without draughts, and without regard to external temperature. No natural ventilation can possibly fulfil these conditions. Under the ordinary English weather a class on the same space in the playground might in a few minutes be soon in an atmosphere too foul for healthy breathing. Artificial ventilation is the first necessity for all school rooms, big or little. Too much attention cannot be directed to it. In England the subject is played with; in America, whatever the practice may be, the ideals laid down are right; artificial ventilation for every school room.

The U.S.A. Circular of Information (Bureau of Education, No. 3, 1891) treats of all classes of schools from the smallest to the largest. The country schools, even when single rooms, to be ventilated by means of heated air supplied and warmed by passage through the jacketting of a stove whose products of combustion are carried directly into the outer air. A similar device with gas heating is patented in this country by Bruce.

For large schools mechanical ventilation is necessary, the plenum system, where air is forced in, being preferable to the vacuum system, where the air is drawn out by exhaustion.

Carnelley, who investigated the ventilation of schools very thoroughly, reported that out of 323 schools, representing 276,000

attendance, the means of heating and ventilation were: 47 per cent. used large low pressure hot water pipes and natural ventilation; 27 per cent. open fires, and the remaining 26 per cent. other devices. He concluded that the first cost was:—

Ventilation.	Heating.	First Cost. Heating and Ventilating only.	
		Per Head.	Per 1,000.
		s.	£
Natural ventilation	Open fires	4	200
	Hot pipes { small high pressure	8	400
	Hot pipes { large low „	10	500
Mechanical ventilation with hot air	In new premises	17	850
	In old premises altered	20	1,000

He states that a school of 1,000 with mechanical ventilation and warming will not cost more than 20*l.* per annum over any other system, and this will be gained in school efficiency, and gives the comparison—

Ventilation.	Percentage of Passes.			Grant Earned.	Volumes CO_2 in 10,000.	Micro-organisms in a Litre of Air.
	Reading.	Writing.	Arithmetic.			
				s. *d.*		
3 schools; mechanical	99·6	97·8	92·4	21 8	15·4	8
15 schools; natural	95·6	90·4	84·2	19 6	22·2	61

which shows more grant earned, and better work done, as tested by examination results, by the well nourished brains of the children in the mechanically ventilated schools.

For the artificial ventilation of a school by warmed air 1,000 cubic feet per hour per child should be the lowest estimate; the accommodation being reckoned at 10 square feet per child, 8 square feet in infant departments. The inlets to rooms should allow 13 square inches, from which 10 per cent. is deducted for ineffective area, per child, the outlets being somewhat larger. The velocity of the incoming air should not exceed 5 feet per second. The temperature of the room should be maintained at about 60° Fahr. The air is drawn into the building through a large opening, passes through a filtering screen of coarse jute cloth, kept damped by a small jet of water; it is then drawn through the fan, which must be large, the high speeds at which small fans have to run causing much noise. The air is warmed in the ducts, as near the point of delivery as possible, preferably by large low pressure hot water pipes. The specific heat of air being very low, radiators may be needed to help in the heating of the building at first. A wet and dry bulb thermometer should be kept in the rooms, at a difference of 4° or 5°, so that the air may not be too dry. The

subjective feeling of moisture or dryness of the air inside depends on its relation to the hydrometric state of the outer air.

The inlets of the ducts to the rooms should be 8 or 10 feet, the outlets a foot above the floor level. With such arrangements 13 feet will be high enough for the rooms, so far as ventilation is concerned. The deposit of dust from hot air on cold surfaces is not a measure of the impurity of the atmosphere, it simply indicates a warm current of air, and depends on molecular causes which need not be discussed here.

The air of schools generally is excessively foul, and the smallest country schools are the worst. Dr. Reid investigated 18 schools in the rural district of Stafford. In 13 out of the 18 the carbon dioxide exceeded 20 vols. in 10,000, and in 4 was as much as 30 vols., one school showing 37 vols. In 15 out of the 18 there was double the amount of carbon dioxide required to classify the atmosphere under De Chaumont's "worst class."

In the summer of 1894 Dr. G. H. Bailey examined the atmosphere of 12 school rooms in Manchester and Salford. The work took several weeks, during which no other work could be undertaken by him. The conditions were comparable, and the weather such that the windows were kept open all the time. He found temperature relations outside and inside of $\frac{70°}{70°}$, $\frac{73{\cdot}4°}{73°}$, $\frac{69°}{68{\cdot}5°}$, $\frac{69°}{72°}$, $\frac{65°\text{F.}}{66{\cdot}6°\text{F.}}$, and concluded that under such circumstances the provision of fresh and removal of foul air naturally is quite impossible. Yet his results under the very unfavourable conditions of July weather, show better school air in the town than in the rural schools examined by Dr. Reid.

Air of Manchester Schools.

1894. Date.	School.	Room.	Excess of Carbon Dioxide Vols. per 10,000 over Outer Air.	Germs per Litre of Air.				
				Outside Air.		Inside Air.		Difference in Bacteria only.
				Bacteria.	Moulds.	Bacteria.	Moulds.	
June 27	Webster Street	School	7·0	6	46	112	28	106
,, 29	,,	Class	11·4	9	22	163	—	159
July 4	Lloyd Street	School	9·2	75	56	280	—	205
,, 4	,,	Class	10·0	75	56	224	56	149
,, 9	St. Stephen's	Upper school	12·8	91	4	252	—	161
,, 9	,,	Lower ,,	11·0	91	4	224	28	133
,, 9	Grecian Street	School	10·0	12	9	98	—	86
,, 9	,,	Class	12·5	12	9	28	—	16
,, 10	Granby Row	Infants	11·5	109	40	322	70	213
,, 12	,,	Class	13·2	112	37	348	68	236
,, 12	,,	Girls	11·0	112	37	398	44	286
,, 9	St. Stephen's	Class	14·5	—	—	—	—	—

Carnelley, whose previous work has already been referred to, also examined the air of schools ("Journal of Pathology," November, 1893). The results are given for Scotch schools:—

Air in Scotch Schools.

	Natural Ventilation.				Mechanical Ventilation.		Total.
	Country Schools.	Suburbs and Country Towns.	Aberdeen Town Schools.	Dundee Town Schools.	Aberdeen Town Schools.	Dundee Town Schools.	All Schools (except Dundee).
Number of schools	28	14	17	19	3	4	48
,, rooms	45	46	42	39	12	25	111
Cubic feet per person	148	160	138	168	155	164	—
Per cent. windows open	24	32	28	22	—	3	—
Temperature inside	60·1	60·5	58·5	55·6	55·3	62·0	59·7
,, outside.....	51·3	49·8	44 3	38·8	42·3	38·0	47·4
Vols. CO_2 in 1,000 (outside = 3·1)	16·1	16·7	18·0	18·6	12·3	12·3	16·3
Excess of organic matter	2·4	3·4	4·8	7·8	1·1	1·1	—
Bacteria per litre	70·0	98·2	134·5	151·0	18·0	16·0	—
Moulds ,, ...	5·6	4·4	1·5	1·1	1·8	0·6	—

When grouped according to the mode of heating:—

Mode of Heating and School Air.

Mode of Heating.	Schools.	Rooms.	Cubic Feet per Person.	Per Cent. of Windows Open.	Temperature.		Vols. CO_2 in 10,000.	Micro-organisms per Litre.	
					In.	Out.		Bacteria.	Moulds.
Mechanical ventilation by warmed air	6	32	160	1·5	58·6	40·1	12 3	17·5	1·0
Natural ventilation and hot pipes	17	43	176	37·0	58·4	46·4	16·3	96·5	1·1
Natural ventilation and open fires	33	84	145	30·0	58·4	44·8	19·2	153·2	4·8

In naturally ventilated rooms the cleanliness of the children and of the rooms was noted. The number of micro-organisms per litre of air was found to be influenced more by the condition of the children than of the room:—

Cleanliness and State of School Air.

Degree of Cleanliness of	Clean.	Medium.	Dirty.
Children	63	99	159 } number of micro-organisms per litre of air.
Rooms	85	94	139 }

The influence of the age of the children, reckoning it by standards, was :—

Class and School Air.

Age by Standards.	Infants.	I.	II.	III.	IV.	V.	VI.
Number of cases	48	22	35	49	42	28	43
Cubic feet per person	118	122	146	148	164	166	176
Vols. of CO_2 in 10,000	15·0	16·6	16·6	16·6	16·9	16·9	16·4
Micro-organisms per litre....	167	146	106	76	69	68	51

Carnelley found that the smell of the air, the carbon dioxide present, and the numbers of micro-organisms, bore the following relations :—

Purity of Air. Carnelley.

Smell of Air.	Vols. CO_2 per 10,000.	Micro-organisms per Litre.
Fresh	13·2	83
Moderately unpleasant	16·7	96
Very unpleasant	22·4	150

He sums up by suggesting as a standard of purity that school air should not exceed $CO_2 = \frac{13}{10,000}$, that is 9 vols. excess, whilst dwelling houses should not have more than $\frac{10}{10,000}$, or 6 vols. CO_2 in excess of outer air.

It is obvious from his results that the bacteria in the air decrease with the age of the children, and also decrease with their relative cleanliness, hence even the purity of the school air is to some extent a matter of home influences.

The cleanliness or otherwise, the smell of a child with dirty feet, or with ozœna, or bone disease of the ear is scarcely noticed amongst the many odours of a naturally ventilated class-room, but is obvious, and becomes obtrusive in a mechanically ventilated school. The *bouquet d'enfant* is most marked in junior classes, and probably amongst children from back to back houses or dirty homes is more offensive than with others. The method of sewage removal even may influence this: the privy system tending to dirty habits and filthy clothes. Considerable care then is required in cloak room provision, especially in attending to efficient ventilation, often quite neglected. No wood, to harbour insects, nothing but iron rods and wire racks should be allowed.

Lighting of Schools.—Next to the warming and ventilation of schools, in importance comes the lighting. Everything in or about

a school should be visible, there should be no dark holes or corners. A school should be like the modern surgeon's operating room, freely accessible and visible everywhere to air and light. School children should live in "sweetness and light"—cleanliness can only be taught by example, not by precept. This extensive lighting requires window area of at least one-fifth, better one-quarter, the floor space; that again necessitates mechanical ventilation, because for half the year the windows act as great coolers of the air, which, hot and foul from respiration, unless extracted or driven out, rises up to be cooled by and descend down the windows in an impure cold draught on the children's heads and necks.

The Education Department forbids skylights, which furnish admirable diffused light. A minimum effective window area is not prescribed by the code, and in many town board schools, through extensions or the erection of adjacent buildings, windows provide effective illumination from only a fraction of their area. Cohn, using the stereogoniometer, found 30 per cent. to 50 per cent. of window area in German schools not effective through wooden frameworks or architectural embellishments. The windows should be arranged to the left hand of the children at work, otherwise shadows interfere, or else the eyes are strained by indirect and unfocussed light; with light directly from behind, a flare spot from excessive regular reflection on the paper of the books will cause local retinal exhaustion. Artificial lighting in schools is practically always defective in distribution: the illumination varying inversely as the square of the distance, suggests a large number of well separated jets. The light from incandescent gas mantles is cheaper than the ordinary batswing burner, and is only surpassed by the incandescent electric lamp, which gives the minimum of heat and does nothing to foul the atmosphere.

The wall surfaces, furniture, and curtains should all be of a light colour, without glaze, to diffuse light about the room; dark wood or dark surfaces cause much loss of light.

Growth of Children.

The children dealt with in public elementary schools are those from the ages of 3 to 14 years. During this period of evolution there is scarcely for even a month a period when the child is not actively growing, and not uniformly in all parts. The measurements most readily made are height and weight. Axel Key, from measurements in Denmark, Sweden, and Belgium, concluded that boys grow in three distinct periods, about the eighth, tenth, and fifteenth years; that they grow most rapidly in height during the early summer, and in weight in the late autumn. He found that more than one-third of the children whom he examined suffered

from chronic maladies: 13·5 per cent. had habitual headache, a symptom, however, which, being subjective, is of very doubtful value, and which Dr. Crichton Browne noted as present in over 52 per cent. of girls and 40 per cent. of boys in London schools. Key noted about 13 per cent. as pallid, and that myopia progressed with age and class in school. Bowditch, of Harvard, made measurements on 24,595 pupils in 1875, and Franz Boas, in Worcester, Massachusetts, in 1891, made detailed measurements on 2,500. The best measurements of English people are those published by Roberts for the British Association Anthropometrical Committee. The mean stature and weight in the same population at different ages varying with the social condition of the individual, and in the same social class with town or country life. As regards children the average of all classes and conditions measured without shoes is:—

Age last Birthday	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Males	36·82	38·46	41·03	44·00	45 97	47·05	49·70	51·84	53 50	54·99	56·91	59 33
Females..	36·23	38·26	40·55	42·88	44·45	46·60	48·73	51·05	53·10	55·66	57·77	59·80

Besides the growth of the body, the absolute growth of the brain is of importance. The increase in absolute weight goes on rapidly until about 7, after which there is a slackening in the rate of growth, which ceases after 9 or 10, any growth after that age being almost inappreciable (Donaldson, "Growth of Brain," p. 104).

Hearing of Children.

School children only open out slowly, a child of less than 8 or 9 has not had its faculties fully developed, and although sensory tests are supposed to be vitiated by the child's stupidity, yet repeated careful testings under like conditions are of some use. They do not point, as would be expected, to any differences with age in earlier school years so far as regards skin sensibility or hearing, but there is no doubt that the visual functions in many cases only develop slowly. The left ear is defective more often than the right, nearly 3 to 2; the left eye is defective too compared with the right. Some London observations gave 11 to 10. Warner noticed that in asymmetrical heads the forehead more often was sloped away to the left. These coincidences are scarcely matters of nervous organisation, except as showing the better

growth of the whole right side of the body, which is associated with the same cause that makes the majority of people right handed.

The testing of hearing is very unsatisfactory. A standard test would be with a telephone and interrupted current from a phonograph, but this has not been found practicable. Testing with the same watch 330 boys and girls, distributed in schools, 155 infants, 49 first, 49 second, and 77 third standard; testing repeatedly, eyes shut, back to observer, watch always approaching, and hand on side on which it was heard being held out when heard, the results were got fairly concordant, but the hearing powers even in the sharpest children seemed much less than in adults.

Adults Hear Watch at 36 inches.	Numbers Seen.	Distance in inches at which Watch became Audible.							
		Right Ear.				Left Ear.			
		Less than 5″.	5″ to 10″.	10″ to 20″.	Over 20″.	Less than 5″.	5″ to 10″.	10″ to 20″.	Over 20″.
5 years old...	94	12	13	38	31	12	22	33	27
6 ,, ...	88	9	11	36	32	12	18	31	27
7 ,, ...	41	4	9	8	20	6	9	11	15
8 ,, ...	58	6	8	21	23	8	12	22	16
9 ,, ...	37	6	2	14	15	6	9	9	13
10 or more	12	—	3	4	5	3	2	4	3
	330	37	46	121	126	47	72	110	101

The stupidest boys and girls are generally the deafest, just, as will be seen, they also have most defective visual acuity. Thus testing all the ears in the front row of a large Standard I, the average was 5·9 inches, the sharper children in the second row averaged 9 inches. This stupidity associated with a slight degree of deafness often has a very characteristic *facies*, an open mouth, stooping shoulders, and pinched nose, due to the fact that there is respiratory obstruction from adenoid overgrowth in the upper part of the pharynx, as first described by Meyer, of Copenhagen. Such children snore when asleep, and the teachers always have noted their irregular behaviour, which is peculiar and mostly inattentive. Without surgical treatment, such children often pass through their school days as weaklings, and not infrequently later become deaf. Such conditions are very prevalent, and it is probable that, town air being more irritating, and town life less bracing, urban populations suffer more than country.

Town life does not call forth the full development of the respiratory powers, and practically all town children are costal or clavicular breathers, a consequence being less fully aërated blood,

and extra liability to all the various nutritional disorders that town life produces so fully.

Exercise in breathing is wanted in all schools. The children do not gain in power of filling their lungs, but they gain in the power of emptying them, and thus exercise gives greater tidal air. For pupil teachers correct breathing is of the first importance in the management of their voices. They should be taught to breathe deeply and keep the voice pitched low; instead of which, shallow breathing, impeded respiration from corsets, and a strained high pitched voice, wearing out the child's attention and the teachers' larynx, is common. Cases of "board school" laryngitis are due to ignorance of proper respiratory methods.

Exercise.—The code of 1891 first required physical exercises and drill. Informal exercise is always better than formal. Good games are wanted, and in towns open spaces for the children other than streets. This necessity will only be realised when its cost will be almost prohibitive. Coarse and massive movements ought to be practised, the maximum of muscle work with the minimum of brain exertion. An additional sensory stimulus often aids in calling forth a considerable response to but slight mental effort, if applied at the proper time; this is the *rationale* of a military band, and to save mental effort, music should be part of the equipment of all schools.

Vision of School Children.

In the case of vision the determination of visual acuity is a measurement capable of considerable accuracy; but repeated experiments with the same child will also show that the acuteness of vision is variable from day to day and from hour to hour; of course within small limits, according to the work and light to which the eye has been recently subjected. Colour vision is congenitally abnormal in a minute proportion of children. Ordinary acuteness of vision is commonly said to be deteriorating rapidly, from relative loss in the refractive power of the eye (due to lengthening of the optic axis from stretching of the posterior part of the globe).

In London schools Dr. Crichton Browne reported (Report to Education Department, No. 293, 1884):—"There is one defect, "which although perhaps not so much a measure of over-pressure "as of improper conditions under which school work is carried on, "still seemed to demand attention, and which therefore I included "in my inquiries, that is, shortsightedness, which is developed "almost exclusively during school life, and which has been proved "to arise from the use of the eyes under unfavourable optical "conditions."

Dr. Browne's table is as follows:—

Table Showing the Prevalence of Shortsightedness among the Children in Elementary Schools in London. (*Crichton Browne*, 1884.)

Standard.	Boys.			Girls.			Total.		
	Total Number.	Short-sight.	Percentage of Shortsighted.	Total Number.	Short-sight.	Percentage with Shortsight.	Totals Examined.	Short-sight.	Percentage with Shortsight.
I	760	16	2·1	578	18	3·1	1,338	34	2·5
II	854	30	3·5	773	28	3·6	1,627	58	3·6
III	707	38	5·4	610	39	6·4	1,317	77	5·8
IV	607	40	6·6	553	59	10·7	1,160	99	8·5
V	383	40	10·4	387	25	6·5	770	65	8·4
VI	191	15	7·9	177	19	10·7	368	34	9·2
	3,502	179	5·1	3,078	188	6·1	6,580	367	5·6

This is the latest estimate of English children's vision published with authority; as a matter of fact this table is useless, as indeed are most of the figures given in Dr. Browne's report, from the original error in method.[1] An examination of children with reading types shows that they cannot be differentiated in this way satisfactorily, and the children pointed out as shortsighted by their teachers are in the majority of cases hypermetropic. The table agrees with the observations of German workers. Most of the children in Germany work in schools under comparable conditions, and it has been demonstrated by Cohn that the higher the school, and the higher the class in a school, the greater the proportion of myopia; and it is argued that school, from requiring protracted near work, usually in a bad light, is one of the circumstances most favourable to the origin and development of short sight.

Cohn first examined 10,060 children, and found the myopia in—

5	village schools	1·4 per cent.
20	elementary schools	6·7 ,,
2	high schools for girls	7·7 ,,
2	middle schools	10·3 ,,
2	real schools	19·7 ,,
2	gymnasia	26·2 ,,

Hypermetropia he only noted in 239 (2·9 per cent.), and as much in girls as boys, and in 23 children regular astigmatism.

Other observers have since made similar inquiries, with results differing only in degree. These results must err on the side of excess, as the methods of testing are such that many cases of

[1] Shortly after this paper was written, a "Report on the Vision of Children "in the Elementary Schools of London," by Dr. Brudenell Carter, was published. It is in complete agreement with the conclusions arrived at by the writer from his observations amongst the children in the Bradford Board Schools.

accommodation spasm, astigmatism, and even slight cases of hypermetropia, would be registered as myopic.

Erisman, of St. Petersburg, first pointed out that a large percentage of school children were hypermetropic, but ultimately seemed to become myopic.

Refraction of the Eye in Relation to Class in School.
(Erisman, St. Petersburg.)

Class...	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.
Per cnt.									
Hypermetropia	68	56	50	41	35	34	32	36	40
Emmetropia	19	28	26	27	26	24	25	21	18
Myopia	14	16	22	31	38	41	42	43	42

It therefore seems probable that school work is an important factor in the development of myopia; but it must also be remembered that age increases as we ascend from class to class in a school; and what really happens appears to be that children are born hypermetropic, and with retina with but little function; this last develops rapidly, attaining its maximum about the middle of school life (probably about the same time that the brain attains its maximum weight). By 10 or 12 years of age most children have normal vision; there are however a considerable number astigmatic, or slightly myopic, and from these abnormal classes the myopic class is chiefly recruited. This last change seems to be more influenced by town or country life than by school buildings.

In England little has been done in relation to school children's vision. Priestley Smith, examining Birmingham school children, found in 1,600 examined 5 per cent. of myopia, and of teachers at the training college 20 per cent. myopic.

In New York Loring found that the Germans had 23, American born 19, and Irish 14 per cent. of myopic. The best results are Wallace's, of Philadelphia, who found 11 per cent. of myopia in 2,582 eyes examined under atropine, and the rest hypermetropic. These were not of the general population, but seen at hospital; they serve to show the small amount of real myopia.

The school doctor has only indirectly to deal with myopia, his action in regard to it must be prophylactic. The large class of temporary defects, the remote effect, for instance, of a single week of neglected corneal inflammation, may take a couple of years to get over, are worth consideration from their effects in hindering education. Such causes are nearly all due to home influences of an adverse nature.

The first inquiry is as to whether a child has normal vision, it

merely complicates matters if each eye is measured separately. An estimate of the acuity of vision under ordinary circumstances is wanted. Normal vision is defined as such that the form of an object, say a printed letter, should be distinguished clearly when it subtends an angle of 5′ (five minutes).

In accordance with this idea, children have been examined in London, Liverpool, and Bradford. In London, out of several thousand, 43 per cent. boys and 35 per cent. girls were defective in one or both eyes. In Liverpool, owing to a report from H.M. Inspector that 25 per cent. of the girls in a Standard IV class had claimed and been allowed exemption from sewing owing to defective vision, a preliminary examination of 1,750 children was made by Dr. R. J. Hamilton, who found 34 per cent. boys, and 44 per cent. girls defective. The report to the School Board concludes:—

"The School Board authorities are not to blame for the initial "mischief, which is an ill development of the eye itself, and the "causes are the conditions under which our city children are "brought up, viz., the narrow streets, small and overcrowded "rooms, the want of fresh air, the wretched and inefficient "food, but they will be to blame if they do not take steps to "detect these defective ones in the earliest stages possible."

The most complete examinations are those of the Bradford School Board, where every child in the standards is examined annually; if defective vision calls for treatment, the parents are notified once, twice, or thrice; and this having been done, the function of the board's medical adviser as regards individual children ends.

The Bradford Board Schools are divided into two sections: in one the school year ends in January, in the other in June. Once every year, in the third month of the school year, April or September, as may be, when the light is fairly constant during the day, the children are tested by copying test letters of a standard type, prepared by Pickard and Curry, of London.

The type are block type, each letter is square, with the lines of the letter equal in width to one-fifth the side of the square. They are arranged to be suitable for any distance from 10 to 20 feet.

The size of the letters to be read by normal vision at any particular distance can be found from the equation—

$$\frac{\text{height of square letter in mm.}}{\text{distance of eye in feet} \times \frac{3}{1000}} = \tan 5' = \cdot 00145.$$

Using this formula the sizes of the letters represented on the test card were obtained—

Distance in feet at which letter should be visible to normal eye.....	60	40	30	20	18	16	14	13	12	11	10
Height of square letter in millimetres..... ...	26	18	13	9	8	7	6·1	5·75	5·25	4·75	4·5

letters made of such sizes subtend at the given distances an angle of 5′.

The test card is hung in a fair light centrally in front of a class of children, the nearest horizontal distance in feet from the card to each row of desks is measured by the teachers; it must not be less than 10 nor greater than 20 feet.

Paper sheets are distributed to the children, with spaces at the top for the name in full, age, standard, and school, a square space at the top right hand corner, under which is printed, "space for " the number as told by the teacher," is filled in by the child with a number representing the distance in feet of its desk from the test card.

The children are then told to fill in on the sheet all the letters on the card, and where they cannot distinguish any letter clearly, to make a cross. Children who wear spectacles at the examination write "glasses" after their names, children who work half-time, write "H.T." after their names.

The papers are then collected, and forwarded to the Medical Superintendent, who thus obtains a record of name, age, sex, standard, school, whether wearing glasses or working half time, distance from test card, and smallest type correctly distinguished at that distance.

The distance at which the child sat as numerator, and the distance at which the smallest type clearly read should be read by a normal eye as denominator, gives the ratio of acuity of vision to the normal. If this fraction is less than unity the vision is defective, if greater than unity it is hyperacute.

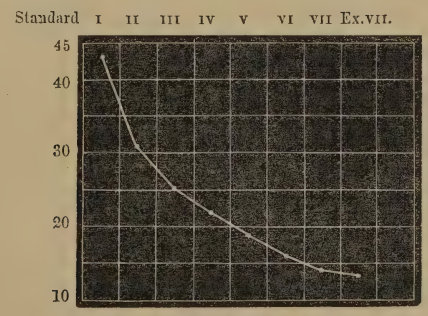
Children examined orally with types as a control, give practically the same results as with papers, but in the case of the younger children it may take a very long time to find out what the vision really is.

The following table gives the result of examinations held so far, the numerators giving numbers defective, and the denominators the total number examined.

Result of 39,118 *Examinations of Visual Acuity in Bradford Board Schools (proportions defective).*

Standards.....	I.	II.	III.	IV.	V.	VI.	VII.	Ex.VII.
September, 1894.....	—	421/1,580	325/1,585	262/1,478	244/1,424	151/1,146	74/585	19/149
April, 1895.....	—	463/1,180	373/1,392	354/1,374	230/1,222	161/815	39/181	3/15
September, 1895.....	—	453/1,497	386/1,531	327/1,594	297/1,433	174/989	66/520	11/123
April, 1896	438/944	520/1,539	434/1,503	326/1,414	275/1,279	144/918	61/350	—
September, 1896.....	516/1,250	435/1,537	374/1,542	375/1,628	259/1,522	173/1,203	76/654	28/216
Totals.....	954/2,194	2 292/7,333	1,892/7,553	1,644/7,488	1,304/6,680	803/5,071	316/2,290	61/503
Per cent. defective....	43	31	25	22	19	16	14	12

DIAGRAM II.



Percentage with defective visual acuity.

39,118 children in Standards. Bradford Board Schools.

During the past year all the children have been examined once as regards acuity, except children in Standard I, in the autumn section of schools; classified according to age the results are seen in the following table.

Visual Acuity of 15,552 Children Classified by Ages last Birthday.

Age Last Birthday.....	6.	7.	8.	9.	10.	11.	12.	13.	Totals.
Number of papers classified	431	1,598	2,460	2,681	2,776	2,592	2,297	707	15,552
Number showing defective visual acuity	206	572	697	658	676	518	442	132	—
Percentage with visual acuity defective	47·8	35·7	28·3	24·6	24·5	19·9	19·3	18·8	—

In the schools examined in September, 1895, there were 9,196 papers returned; 1,378 were Standard I, and 30 from deaf classes, which were not classified fully. Of the 7,788 analysed 3,899 were from boys and 3,888 from girls. Of the whole number 6,073 had visual acuity at least normal, of these 2,698 presented V.A.$=\frac{3}{2}n$ or more; on the other hand 1,614 were defective in acuteness, and of them 702 had vision not exceeding $\frac{2}{3}n$ ($=\frac{6}{9}$ Snellen). Only 48 boys and 68 girls returned themselves as wearers of spectacles during the examination, probably that is too low.

The details of this examination are given in the tables on the opposite and following pages, and for boys and girls separately.

Standard.		AGE LAST BIRTHDAY. 6. A B C D	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	Totals.
II	A	.	28	39	8	3	3	1	1				83
	B	.	49	49	12	9	2	1	.				122
	C	.	146	168	47	15	3	1	.				380
	D	1	75	84	20	8	3	1	.				192
III	A		.	25	25	7	7	2	3				69
	B		2	23	45	20	7	2	.				97
	C		1	114	122	64	20	5	1				328
	D			66	104	51	8	11	2				243
IV	A			.	21	21	10	6	.	.			58
	B			2	20	29	11	9	3	1			75
	C			3	127	103	46	28	7	.			314
	D			2	131	156	47	23	6	.			365
V	A				1	24	28	16	5	1			75
	B				2	30	36	8	4	1			81
	C				3	123	108	41	14	1			290
	D				10	154	99	35	13	3			314
VI	A					.	19	10	3	.			32
	B					.	11	27	7	.			45
	C					4	89	84	17	1			195
	D					6	127	92	19	2			246
VII	A						1	9	1	.	.		11
	B						.	8	5	.	.		13
	C						4	73	20	1	1		99
	D						3	95	30	1	1		130
Ex. VII	A							.	1	.	1	.	2
	B							2	.	.	.	.	2
	C							2	8	5	1	.	16
	D							6	11	5	.	.	22
Totals	A	.	28	64	55	55	68	44	14	1	1	.	33
	B	.	49	74	79	88	67	57	19	2	.	.	435
	C	.	148	285	299	309	270	234	67	8	2	.	1,622
	D	1	76	152	265	375	287	263	81	11	1	.	1,512
Total	A+B	.	77	138	134	143	135	101	33	3	1	.	765
	C+D	1	224	437	564	684	557	497	148	19	3	.	3,134
A+B+C+D / A+B		. / 1	77 / 301	138 / 575	134 / 698	143 / 827	135 / 692	101 / 598	33 / 181	3 / 22	1 / 4	.	765 / 3,899
Percentage with V.A. defective		.	25	22·2	19·2	17·5	19·5	16·9	18·2	13·6	—	—	19·6 per cent.

N.B.—48 were recorded as wearing spectacles during examination.

The columns in each square are: A. Vision less than $\frac{2}{3}$ *n*; B. Vision greater than $\frac{2}{3}$ *n* but less than normal; C. Vision more acute than normal but not $\frac{3}{2}$ *n*; D. Vision $\frac{3}{2}$ *n* or acuter.

Girls. Acuity of Vision, Examined September, 1895, *Bradford.*

Standard.	AGE LAST BIRTHDAY. 6.	7. A B C D	8.	9.	10.	11.	12.	13.	14.	15.	16.	Totals.
II. A	.	31	35	11	1	4	.	.				82
B	2	76	54	21	10	2	1	.				166
C	.	156	145	31	10	6	.	.				348
D	2	50	52	16	4	.	.	.				124
III		1	25	35	10	6	4	1				82
		4	51	53	22	8	.	.				138
		1	148	127	59	15	7	1				358
		1	91	81	31	10	1	1				216
IV			.	28	37	17	5	.	.			87
			2	38	37	17	8	4	1			107
			2	132	130	58	24	7	1			354
			1	84	90	40	13	6	.			234
V				1	26	15	17	7	.	.		66
				.	28	27	13	7	.	.		75
				6	112	111	47	28	2	1		307
				4	87	91	31	11	1	.		225
VI				.	.	8	20	4	1	.		33
				.	1	24	29	9	.	1		64
				2	1	101	95	37	4	1		241
				.	7	100	94	29	3	.		233
VII					.	1	14	4	.	.		19
					.	.	15	7	1	.		23
					.	6	74	27	4	3		114
					.	2	72	28	9	.		111
Ex. VII						.	.	2	1	.	.	3
						.	.	1	2	1	1	4
						.	6	21	3	4	1	31
						.	2	22	14	1	1	43
Totals A	.	32	60	75	74	51	60	18	2	.	.	372
B	2	80	107	112	98	78	66	28	4	1	1	577
C	.	157	295	298	312	297	253	121	14	6	1	1,753
D	2	51	144	185	219	243	213	97	27	4	1	1,186
Defective, A+B	2	112	167	187	172	129	126	46	6	1	1	949
Normal, C + D	2	208	439	143	531	540	466	218	41	10	2	2,939
A + B	2	112	167	187	172	129	126	46	6	1	1	949
A + B + C + D	4	320	606	670	703	669	592	264	47	11	3	3,888
Percentage V.A. defective	50	35	27·5	27·9	24·4	19·2	21·2	17·4	12·7	9·9	—	24·4

N.B.—68 were returned as wearing spectacles at the time of examination.

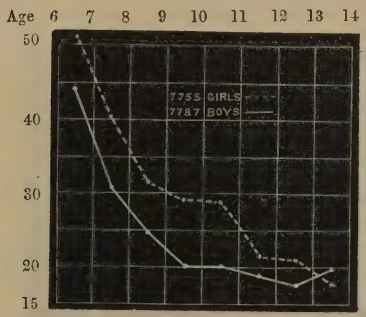
A, B, C, and D are the four classes of bad, fair, good, and excellent vision.

Including with these figures the results from another set of schools examined in April, 1896, we get the following tables and Diagram III:—

Showing V.A. Defect in Boys and Girls at Different Ages.

	Ages....	6.	7.	8.	9.	10.	11.	12.	13.
Numbers defective to total numbers	Girls	110/215	330/815	393/1,243	386/1,327	383/1,321	277/1,308	241/1,141	68/385
	Boys	96/216	242/783	304/1,217	272/1,354	292/1,455	241/1,284	201/1,156	64/322
Percentage with V.A. defective	Girls	51·2	40·4	31·6	29·1	29·0	21·1	21·1	17·6
	Boys	44·4	30·9	24·9	20·0	20·0	18·7	17·6	19·8

Diagram III.



Percentage with defective visual acuity at various ages.

The same papers distributed in standards give the following table:—

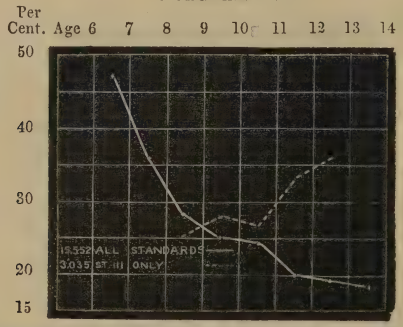
Showing V.A. Defects in Boys and Girls in Different Standards.

	Standards	I.	II.	III.	IV.	V.	VI.	VII.	Ex. VII
Numbers with V.A. defective	Girls	240/457	518/1,461	488/1,543	391/1,503	306/1,280	180/1,051	66/439	7/81
	Boys	198/487	455/1,575	332/1,491	262/1,505	266/1,432	138/956	61/451	4/42
Percentage with V.A. defective	Girls	52·5	35·4	31·6	26·0	23·9	17·1	15·0	8·6
	Boys	40·7	28·0	22·3	17·4	18·5	14·4	14·1	9·5

The percentage of girls with defective visual acuity (V.A.) at school ages is greater than that of boys. Dr. Warner in his inspection (Report, p. 38) found that in visual affections, as in all other respects, girls are less defective than boys, but his observations are on noticeable defects, *e.g.*, squint, nystagmus, coloboma, so that the above results are not incompatible with his. The percentage with defective vision cannot be stated correctly as a percentage of a number of school children, as *it diminishes from year to year with age, and from class to class as we ascend in the school*, and will depend chiefly on the age and sex distribution in any school. Yet if any one standard be taken, it is found that the percentage of defect tends to increase from year to year with age in the standard.

Taking Standard III as most varied in composition, and yet not disturbed by the elimination of children to work, the analysis of Standard III in September, 1895, and April, 1896, gave Diagram IV and the table immediately following it:—

DIAGRAM IV.



Percentage with defective visual acuity at various ages.

Defective Vision at Various Ages in Standard III, Bradford.

Ages...	7.	8.	9.	10.	11.	12.	13.
Girls	6/14	172/601	187/590	82/236	28/71	12/26	1/5
Boys	2/9	96/496	136/573	55/265	23/84	14/47	6/18
Girls pr. cnt.	—	28·6	30·0	35·0	39·5	46·0	—
Boys pr. cnt.	—	19·0	24·0	20·0	26·0	30·0	—
Total pr. cnt.	—	25·0	28·0	27·0	33·0	36·0	—

In the other standards similar results occur in percentages of defective vision—

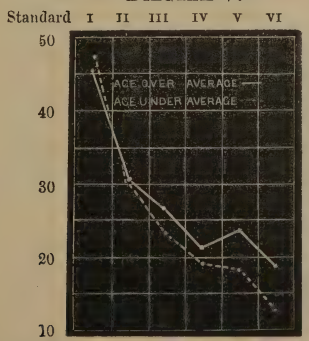
Age.....	10.	11.	12.
Standard III	27·0	33·0	36·0
,, IV	20·5	22·7	24·1
,, V.....	18·4	20·4	28·4
,, VI	—	12·9	19·0

So that if the various Standards II, III, &c., be taken to have a mean age 8, 9, &c., and the children be divided into groups, younger, who have not reached the birthday, and older, who have passed it, we get a younger and mentally sharper group in each standard, and an older and mentally duller group; and the V.A. of these groups in each standard is given in the accompanying table and Diagram V.

Showing Numbers and Percentages of Boys and Girls and Children with Defective Visual Acuity in Standards in Older and Younger Groups.

Standards ...		I.		II.		III.		IV.		V.		VI.	
		Number.	Percentage.	Number.	Percentage.	Number.	Percentage.	Number.	Percentage.	Number.	Percentage.	Number.	Percentage.
Age below average of standard	Boys	—	—	77/299	25·7	48/231	20·7	43/306	14·0	57/347	16·4	30/256	11·7
	Girls	—	—	109/317	34·3	81/322	25·1	68/287	23·7	55/264	20·7	33/244	13·5
Age above average of standard	Boys	—	—	128/479	26·7	118/506	23·3	90/506	19·7	107/421	25·4	47/262	17·9
	Girls	—	—	139/403	34·4	139/472	29·4	126/495	25·6	86/409	21·0	64/327	19·5
Totals below age		202/429	47·0	186/616	30·1	129/553	23·3	111/593	18·7	112/611	18·3	63/500	12·6
,, above ,, ...		236/515	45·8	267/881	30·3	257/978	26·2	216/1,001	21·5	193/830	23·2	111/589	18·8

DIAGRAM V.



Percentage with visual acuity defective in standards.

The diagram illustrates the separation in visual acuity of the two groups of children as they progress through the standards.

The sharper children will go as half-timers earlier than others, but any attempt at analysis is very difficult. Children cannot go to work until they reach the age of 11 years and pass Standard IV.

Percentages with Defective Visual Acuity, Bradford.

	Ages...	11.	12.	13.	Totals.
Standards IV to VII	Half-timers only	16·0	16·5	20·7	16·9
	Non H.T. only	18·5	21·7	17·9	19·4
All standards	All children	19·4	19·0	17·7	18·5

or, by standards, we have—

Percentages, Visual Acuity Defective.

Standards...	IV.	V.	VI.	VII.
Half timers only	16·6	22·0	16·3	13·6
Non H.T. only.....	23·6	23·3	16·0	13·3

The effect of half time exemption, and full time more so, is to filter off a number of mentally sharp and visually clear sighted children, leaving the duller ones with a larger proportion of defective vision behind. By the time these young half-timers have got to full time the duller ones come on as half-timers too, and by their transference appear to increase the percentage of defective vision with age in half-timers and diminish it amongst the non half-timers. So that defective vision apparently increases with the age of half-timers, but only because it is those kept back by defect in brain or eyes who are still half-timers at that age.

Eye Training by Surroundings.

When the causes of this defective vision are investigated, inspection of the children reveals no marked defects. The proportion with local defect is small, corneal opacities, cataract, nystagmus or other defects are rare. The chief defect is hypermetropia, but the slightest degrees of this do not account for the great amount of simple amblyopia, due possibly merely to want of training of the retina, as so commonly seen in the least used eye of children who squint badly.

Taking 29 board schools, calling those nearest the centre of the town, town schools, and the 14 farthest from the centre "suburban schools," about half of the latter are not entirely surrounded by streets. The buildings themselves have nothing to

choose one from another, if anything the suburban are the worst as regards lighting and furniture. The classes of children attending them are all artisans, chiefly mill hands' children.

The visual acuity in the different standards in the schools was:—

Percentage with Defective Vision in Town and Suburban Schools, Bradford.

September, 1895, and April, 1896.		II.	III.	IV.	V.	VI.
Girls	Town schools	39	36	29	26	18
	Suburban schools	27	22	19	17	15
Boys	Town schools	33	25	19	17	15
	Suburban schools	25	23	14	12	15
All children defective	Town	36	30	24	21	16
	Suburban	26	23	16	15	15

and with hyperacute vision, that is vision equal to $\frac{3}{2}n$ or more, the percentages were as follows:—

Percentage Hyperacute.	II.	III.	IV.	V.	VI.
Town schools	18	26	34	39	45
Suburban schools	26	33	44	48	47

The actual distribution of the children as regards visual acuity being given in the table below, which includes all ages 6 to 14. (Compare tables on pp. 647-48.)

Vision of Town and Suburban Children, in their Standards.

			II.	III.	IV.	V.	VI.
Girls	Town	A	135	161	118	106	50
		B	229	214	182	127	81
		C	430	426	450	378	291
		D	139	229	286	280	288
	Suburban		40	36	31	20	19
			87	62	48	42	25
			249	212	183	141	133
			105	126	149	150	117
Boys	Town	A	121	96	85	76	40
		B	193	136	116	71	56
		C	534	405	433	336	251
		D	202	297	438	420	339
	Suburban		48	44	28	18	17
			73	65	35	24	19
			221	186	167	120	71
			147	174	235	191	130

To make sure that the effects are due to surroundings and not to different age distribution, it is necessary to classify them according to ages :—

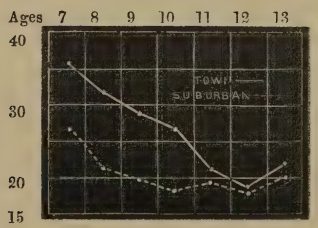
Distribution of Visual Defects in Town and Suburban Children at different Ages.

		Ages...	7.	8.	9.	10.	11.	12.	13.
Girls	Town	A	54	105	109	108	75	60	7
		B	104	161	144	144	111	74	19
		C	174	327	317	303	343	263	71
		D	54	134	177	223	241	219	58
	Suburban		16	30	33	24	18	33	7
			42	48	59	43	35	27	11
			108	202	182	127	158	132	42
			52	91	136	117	141	148	28
Boys	Town	A	44	77	80	77	58	46	21
		B	76	117	99	93	67	53	18
		C	195	362	315	308	256	248	54
		D	81	171	255	327	339	294	54
	Suburban		15	35	28	33	44	28	6
			33	42	41	48	44	36	8
			74	169	170	192	126	101	26
			65	124	167	240	174	155	30

and the percentages presenting defective and hyperacute vision are respectively (Diagram VI) :—

Percentages.	Ages ...	7.	8.	9.	10.	11.	12.	13.
V.A. defective	Town	35·5	31·6	28·6	26·6	20·9	18·7	22·0
	Suburban	26·1	20·9	19·6	18·0	19·0	18·5	20·2
V.A. hyper-acute	Town	17·2	20·9	25·4	34·7	39·0	40·3	36·8
	Suburban	28·8	29·1	37·2	43·3	42·6	45·9	36·7

DIAGRAM VI.



Percentage at different ages with visual acuity defective.

Obviously the greater part of this school defective vision disappears during school life; it does so at an earlier age amongst

boys than amongst girls, and takes a longer time in town than in the suburbs. By the time the sixth standard is reached, *i.e.*, about 11 years of age, the difference between town and country is scarcely noticeable. It is not until after this period that myopia, which in many children is undoubtedly partly hereditary, may be said to develop as a school effect.

In the case of board school pupil teachers, a new class, the result of the Education Acts, heredity is not likely to be a large factor, and although selected by a tendency to mental work, they may be taken as representing the least result of studies continued beyond school life by the average school child. In filling up Form 182 for the Education Department, the refraction of the Bradford pupil teachers has been roughly ascertained by testing with glasses. For testing the refraction of young people the use of atropine is really necessary, and it is scarcely creditable to the medical profession that the majority practice this part of their duties so little, that the work is commonly left in the hands of spectacle sellers or Jewish opticians, who although in an ordinary case of presbyopia they do as well as anyone else, yet cause much harm in the eye troubles of young people, where functional disorders of the intrinsic muscles of the eye are frequent, and where vision is often temporarily improved by glasses which ultimately aggravate the condition.

Testing with glasses can detect pronounced hypermetropia or myopia, but in slight cases judgment is almost guess work.

Two hundred and ten individuals, chiefly girls, from 15 to 18 years old, examined on 320 occasions, at least twelve months intervening before the same individual was re-examined, gave as result :—

Vision of Pupil Teachers. Bradford.

Ages.	Number Examined at each Age.	Manifest Hypermetropia.				Normal Vision, no Manifest Hypermetropia.		Astigmatism, not Myopic.		Myopia and Myopic Astigmatism.	
		At Least + 1·0 D.		+ 0·5 D.							
			Per cnt.		Per cnt.		Per cnt.		Per cnt.		Per cnt.
15	62	14	*23*	19	*30*	17	*27*	3	*5·0*	9	*14*
16	120	33	*27*	32	*27*	22	*18*	9	*7·5*	24	*20*
17	85	29	*34*	17	*20*	13	*15*	6	*7·0*	20	*23*
18	43	12	*28*	7	*16*	10	*23*	1	*2·3*	13	*30*
19	10	2	*20*	2	*20*	1	*10*	2	*2·0*	3	*30*
			52%				*20%*		*7 %*		*21%*

The numbers are rather small to generalise from, the manifest hypermetropia remains fairly constant, and the myopia shows increase; the amount 21 per cent. agrees fairly with Mr. Priestley

Smith's examinations of pupil teachers in Birmingham, amongst whom he found 20 per cent. myopic.

Although we do not agree with those who think that much serious mischief is done by elementary schools, believing that home neglect causes very much more than education can, yet attention must be called to the troubles from which at least 10 per cent. of the school population at its very best suffer, and of which the prevention would greatly add to the efficiency of schooling.

Seats and Desks.

The question of eye hygiene has led in Germany to much study of school seats and desks; the want of technical knowledge is well shown in the unintelligent work of this kind turned out by English manufacturers.

It is reasonable to require that a child should sit in school to work without any undue strain on any particular set of muscles; that it should be properly isolated, well seen, and able to stand in or out of its place without trouble. For this purpose the heights of the children in their foot gear must be known. Foot gear for boys increases the height in summer 1 inch in standard I, and increases 0·2 inch for every standard above that.

In passing we may note the following Bradford school children, with shoes:—

Bradford School Children with Shoes.

Heights in Inches at Different Ages.	Age.		
	11.	12.	13.
293 half-timers	52·2	55·0	55·7
124 non half-timers (in same classes and schools)	53·0	53·2	55·0

Five average artisan schools were taken, and 1,600 children measured, the age to months, height to quarter inches, and standards noted on a chart. It was found that the various standards could be grouped in the middle of the school year as follows:—

Height Groups in Different Standards (Bradford).

Total Number of Children 1,603.	Height Groups.	45″.	50″.	55″.	—
Heights in inches ...	Under 42½	42½—47½	47½—52½	52½—57½	Over 57½
Standard I	37	126	11	—	—
,, II	11	162	90	6	—
,, III	2	93	184	44	—
,, IV	2	39	174	78	9
,, V	2	5	131	107	15
,, VI	—	2	56	137	20

This table shows that 95 per cent. of the school children come within $2\frac{1}{2}$ inches of three selected height groups.

As regards desks and seats, some inquiries made three years ago showed that what were called Bennett pattern American dual desks were being made for the London School Board in the following sizes :—

Description of desk....	No. 1.	No. 2.	No. 3.	Kindergarten.
	ins.	ins.	ins.	ins.
Height of seat	17	$15\frac{1}{2}$	$13\frac{1}{2}$	$11\frac{1}{2}$
„ desk edge	$29\frac{1}{2}$	$27\frac{1}{2}$	$23\frac{1}{2}$	20
Seat, desk—vertical *difference*	$12\frac{1}{2}$	12	10	$8\frac{1}{2}$
„ —horizontal *distance*	A positive distance under 2 inches, as fitted by the makers in the Leeds schools.			

In the schools where these had been fitted other desks were measured, and in several Leeds schools the dimensions were excessive, a difference too great, and a distance from 3 to 9 inches positively instead of zero, or 1 to 2 inches negatively. In Bradford board schools a uniform seat $16\frac{3}{4}$ inches high, positive distance $4\frac{1}{2}$ inches, and difference $11\frac{1}{4}$ inches, was the rule from Standard I to Standard VII until recently, when separate chair seats were introduced. As such representative places have desks and seats so disproportioned to the users, it may be taken that the majority of schools have furniture unsuitable for the children.

Desks and seats are now being generally made smaller, but makers have no definite rules or system to follow, and the Code gives no help, it even encourages, by not condemning, the insanitary dual desk, which in London possibly has a considerable share in the school effect that Dr. Shirley Murphy has demonstrated from notifications of infectious disease.

The rational system of seats is single chairs; the teacher can then walk behind the children if necessary. Taking the measurements adopted in Bradford, it is found that children can write without raising the elbow or twisting the shoulders; the desks may be continuous, 14 inches broad, to take book or slate, without the possibility of the child tilting it on the edge; the slope should be 12° or 15°, the anterior edge of the seat and posterior edge of desk should be in the same vertical plane (distance zero), or even overlapping an inch; each seat to be separated, forming a chair on a pedestal, and thus each child isolated. The pedestals, smooth rounded iron castings, without any beadings or edges for heels or toes to play on.

The Actual Dimensions Recommended for the Bradford Schools are—

	Infants.		Standards.		
Inches. Sizes...	Babies.	Infants.	A. I and II.	B. III and IV.	C. V and VI.
	Ins.	Ins.	Ins.	Ins.	Ins.
Group height of children	38	42	45	50	55
Height of desk edge above seats	6	7½	8	8½	9½
Height of seat from floor	9	11	12½	14	16
Size of seats	11 × 8 × 1½		11 × 9 × 1½		11 × 10 × 1½
,, back rests.....	8 × 5 × 1¼		8 × 5½ × 1½		

These dimensions suit the children admirably, but in any district the sizes required would depend upon the physical characteristics of the children.

The only fault is the want of a reading slope.

Throughout schools generally the furniture is too large. A large class told to sit up on their seats had 85 per cent. of the feet dangling off the floor; they either had to sit thus or to perch themselves on the edge of their seats, with their tibiæ at an angle of 45° instead of horizontal, tending to strain particular muscles, to compress the popliteal arteries, impede the circulation in the legs, and get cold feet or cramps.

When the child leans forward over the distance between the seat and desk and raises his elbow to write, the balance is soon out of gear, the shoulder girdle at an angle, and the head from its weight brought down to rest, till the work being done is injuriously near one eye as compared with the other. Recognising the extraordinary attitude which writing throws most children into, and deeming it due to the oblique slope of writing, teachers have introduced vertical handwriting, which, however, in some cases has developed into a grotesque and illegible mannerism. It should meet with condemnation, and in fact handwriting as now practised is a barbaric relic, which, were it not sanctioned by custom, could not hold its own for a day against stenography in the State schools. On the desks of the majority of schools vertical writing in its best sense, with the body, head, and eyes symmetrically held, is an impossibility; on seats and desks of the dimensions recommended it does not require teaching, but follows as a matter of course.

Next in importance to the bad air of non-mechanically ventilated schools, is the fault of bringing work too near the eyes. This habit begins in the infant departments. Probably 50 per cent. of

infants have vision such that they do not recognise a letter in an instant, but go over it and build it up in their minds preparatory to recognising it; they learn to read standing, the worst position adopted in school. They stand with a book in their hands; that book should be 10 or 12 inches off their eyes, which means either holding it out in their hands, leading to a strain on the flexors of the forearms quite impossible to maintain for five minutes, or else resting hands on the book, with its lower edge on the chest and looking down with bent head on it; they learn to ease muscles from the earliest by bringing eyes and work together. But there is also as a rule poor light in infant rooms, and the children hypermetropic, and as the diffusion circles make small things appear indistinct, the work is brought nearer, the size of the images varying inversely as the distance, whilst the brightness varies inversely as the square of the distance, the result is that they see more clearly, but at the same time have to strain the accommodation to see at all, and the strained convergence and accommodation often breaks down in squint. To remedy this infants should not be allowed to stand to read; all their eye work should be done with frames or boards at a distance, the only writing permitted should be with chalk on the blackboard, out before the class.

Spurious Result Work.

Unnecessary strain is thrown on them by the craving for what may be termed "spurious result" work. Copy or drawing books ruled in fine squares which the children mechanically fill up with patterns are educationally of scanty value, more suitable to be sent home at the term end from a private seminary, than to come out of a scientifically conducted school. All ruled paper and slates must be always and unhesitatingly condemned; they destroy the sense of proportion and judgment of distances, which is at a low ebb already. Plain paper and slates, better no slates at all, will not give immediately such pretty results, but will ultimately educate hand and eye to a perfection impossible with a chequered copy book. Accurate results must not be expected from young children, the fine adjustment of movements required to prick holes along a line, as in the employment known as "embossing," is unattainable, and a task which is positively injurious from nervous apart from eye strain. In a class of boys (6 years old) observed doing this work: at the end of a quarter of an hour from starting $\frac{35}{44}$ were holding their needle holders in forbidden positions, they should have had their eyes at least a foot from the work, but in the same time, estimating the distance in inches,

6 were within 4 inches, 13 between 4 and 6 inches, and only 1 working at a distance of a foot; some were standing up in their places to work, and one had changed to the left hand; the whole class gave the impression of being under nervous strain.

With regard to needlework, the Code gives directions that "needlework of too fine a character will be considered a defect." These regulations, and the instructions to inspectors forbidding stitches finer than 12 to 24 per inch, are most reasonable. Fine stitching is of the nature of spurious result work, mistakes are less obvious, and it is scarcely a credit, because a myope can do stitching or other fine work better than a normal person, and those who can do this fine work best suffer most from doing it.

School Attendance and Illness.—A register should be kept of every child not attending school, and the reason of its absence noted. Possibly 5 per cent. of the child population are absent from school through illness, acute or chronic. Many illnesses are spread over years, and do not come under regular medical observation: such as chronic spinal diseases, muscular hypertrophy, palsies and joint diseases, some functional diseases; most important of which, because in many cases capable of improvement, is lack of control of the sphincters of bladder or bowels. Many spoilt or nervous children, whom to the parents it seems cruelty to coerce, should for their own good be sent to school. We see almost hopeless hysteria incapable of treatment whilst in the home surroundings, where excuse from school is the only course possible, but apart from these are many other cases, which to the layman may seem fit for school, but should be kept out of it; most important of all the group of children's ailments, rheumatism in any form, chorea, or even tonsillitis with any suspicion of these about it, and if there is any chance of a child being tended properly at home it is better there than at school. Others only require treatment. Chronic "weak chests," which is generally another name for the lack of development and catarrhal disposition of a child with "adenoids," chronic discharges from the ear, sore heads, are cases where, unless school attendance is insisted on, the disease is too frequently neglected.

Another, and most important consideration is as to whether a child will lose by attending school or whether it will gain anything by not attending. Many children at school age and in attendance present defects in obvious low nutrition, 3·5 per cent. according to Warner; others are absent from his inquiry for this very reason; so that 4 per cent. may be taken as of low nutrition, and they will remain so whether at school or not, so that mere chronic ill nutrition of an indefinite nature is no reason for keeping a child from school.

Of the cases examined in two years by the school doctor where illness was alleged as reason for non attendance, the result of the report is shown in the table :—

Children alleged Unfit for School from Ill Health. (*Bradford*, 1894-95.)

Age last Birthday...	—	5.	6.	7.	8.	9.	10.	11.	12.	13.
Boys.										
Total number seen	149	24	16	10	19	10	21	24	15	10
Reported fit for school unconditionally	—	14	5	6	11	7	12	13	5	4
Fit for school conditionally	—	4	4	2	4	—	1	3	3	2
Excused from school.....	49	6	7	2	4	3	8	8	7	4
Girls.										
Total number seen	264	13	23	22	30	26	28	43	56	23
Reported fit for school unconditionally	—	7	10	15	16	19	17	26	39	15
Fit for school conditionally	—	2	8	3	4	3	5	12	11	6
Excused from school	50	4	5	4	10	4	6	5	6	6

Thirty per cent. of boys of 11, but only ten per cent. of girls of 11 were excused school. And although girls are in school so much more free from defects than boys, yet here they are nearly twice the number out of the same population; as a result of the examination, however, practically identical numbers were found to be suitably excused from school.

Many children are kept away on any pretext, because useful at home, the selfishness of parents, or their ignorance standing in the way of the child's education, or even worse, I have been told when ordering an Infirmary half-timer out patient with phthisis to be kept from school on account of ill health, "No, she shall go to "school, if she can't go to school they will stop her at the mill." And when a child has been refused exemption for half time on the ground of being not "necessarily" employed, the parents sometimes say if the child cannot go half time, it cannot go at all, and promptly send in a medical certificate of ill health. This question of medical certificates and school authorities has been the cause of some friction. A medical man may, and often does, give a certificate in ignorance of collateral circumstances, which, when known, entirely destroy the value of his opinion. The question of whether a child is fit to attend school is a duty of the education authorities, and a medical certificate is a piece of evidence for their use, which has to be taken into account with other evidence, and it is no disrespect to a medical man if, after weighing the other evidences, the school authority passes over his opinion. For all doubtful cases school boards should take the evidence of a permanently retained medical referee, whose opinion would be given, just as in an insur-

ance case, possibly in ignorance, but certainly independently of any other medical man.

Most of the weakly and ill nourished children who are kept for a time at home neither improve in health by staying at home nor deteriorate by school attendance; many of these are supposed to be victims of over pressure, which, so far as my experience goes, is not caused by elementary schools, but is a symptom in neurotic children. A child who from illness becomes delirious, does not now-a-days "babble of green fields," but of his most striking and novel experiences out of the home, and that is naturally school and its work; such an incident is often referred to as brain fever from overwork, when probably it would have been gone through in but a slightly different form if the child had never been in a school.

Another ground for claiming exemption is that the children are weakly, and that when they attend school they become ill, sometimes feel faint or feel sick in school, generally during a reading lesson, and the commonest of all, that they cannot get up in the morning, and that they cannot eat any breakfast. Debility, late hours of going to bed, and a supper; badly ventilated bed rooms, hurried rising in the morning, and rush to school, all enter into the complex cause of this definite and very common symptom. This is really a home symptom, not a school result. Others of the poorer classes, ill fed, ill clothed, verminous and neglected, really require the day industrial school; and some chronic cases of scrofula, or mere anæmia and debility from town life, where a proper system of country or convalescent schools seems advisable; where the educational cost might be defrayed by a large area, and the actual maintenance by the parents; where selected cases might be sent for five or six months or more, and both mental and physical health looked after.

This last seems to be almost an unthought of necessity, especially for children in very chronic conditions, and if well administered, ought not to be open to abuse. Holiday funds are shockingly abused, where absolutely healthy children are sent for weeks to the country, to the exclusion of weaklings; for instance, I have known a boy with 10*l.* in the school bank sent off for some weeks by a charitable holiday fund.

Feeding of School Children.

Many children attend school in a state of semi starvation; their circumstances have been investigated by the London Charity Organisation Society. The State compels the child to be educated, which is impossible without sufficient food. How are the half starved children in the public schools to be fed whose parents do not or cannot feed them properly at home? Cheap self-supporting

meals and penny dinners, have been tried extensively, but although in most cases with rent and labour free, the dinners were not properly appreciated, and may be said to have been failures, a regular attendance of 200 being unattainable, and yet necessary to be self-supporting. In supplying cheap dinners at less than cost price, the Charity Organisation Society "recognise "the immediate good effect upon the children, but think that the "system entails injurious results" in pauperising the parents, and serious moral results to the children, who are tempted to beg, borrow, or steal the penny required. Why then should the meals not be free? Why should hungry children not be fed at the public expense? Such dinners would bring no permanent relief to the necessitous poor, the residuum whose earnings sink to the lowest living wage; whatever reduces the cost of their family ends in reducing their wages. Food is a natural necessity for existence, to provide it is the duty of the parent who is the cause of that existence; education is an artificial want caused by the State, and therefore, to be provided by the State, but it is no part of the State duty to relieve parents of their burdens. The existence of these half starved children in that condition is due to their parents' faults or to the faults of others, a result of the social system; and apart from the results to the parents, there is the same result as in cheap dinners, of morally influencing, in the direction of deceit and hypocrisy, the children selected for those free meals. In nine cases out of ten taken at random by the Charity Organisation Society this was found to be the case. So that, "taking all these things into consideration, the committee "think that there is no advantage to be gained by establishing at "schools a system whether of free or self-supporting dinners."

This ill nutrition, as already hinted, is not entirely due to lack of feeding; poor, thin, ill nourished children occur in the best families, and as members of families with their brothers or sisters suffering from plethora.

Warner, while inspecting schools, noted ill nutrition in the following percentages of those seen:—

Percentages of Ill Nutrition Cases.	50,000 Children seen in 1888-91.		50,000 Children seen in 1892-94.	
	Boys.	Girls.	Boys.	Girls.
English children	4·0	4·8	2·8	3·4
Upper social class	4·8	5·6	2·2	2·7
Average ,, ...	3·6	4·2	3·0	3·2
Poor ,, ...			3·1	3·6

73 per cent. of the ill nourished had also defects in development; so that ill nourishment must often be due to deep and ancient causes in the individual life history.

Classification of School Children.—All classes of children should now be found in the schools, except those so diseased that school attendance is either impossible for them, or harmful to others.

Children of school age may be grouped thus:—

I. Children suitable for the ordinary schools;
II. Children capable of education under special circumstances, but not suitable for ordinary schools;
III. Cases to be exempt from schools.

The differentiation of these groups from a scientific study of the mental and physical conditions of childhood has been put on a sound basis by the extensive work of Dr. Francis Warner[2] in his observations on nervous actions, and subsequent inspection, and analysis of the records of 100,000 children in schools. The direct outcome of the work has been the attention drawn to the children of subnormal mental capacity, the feeble minded.

In other cases groups one would have supposed to be large, have been found to be small, as in the cases with a record of epileptic fits, or with obvious ricketty defects.

The want of legislative protection prevents a medical man examining children in detail without the express sanction of their parents, as he thereby renders himself liable to action for assault, so that Dr. Warner could do no more than inspect without handling the children. Limited by such conditions, his method is described in the report (p. 11): "Inspection of the children is "most conveniently carried on in a large and well lighted room, the "pupils being drawn up in ranks, a standard at a time, or in groups "of about forty, so that the inspector may view each individual. "It is convenient to fix the child's eyes by asking each in turn to "look at an object held up, *e.g.*, a shilling at the end of a pencil. "The trained observer can read off the physiognomy of the indi-"vidual features and their parts, the facial condition and the eye "movements, the balance of the head and body, &c., as quickly as a "printed line."

The only regrettable thing about this long series of observations is, that whilst the ages were noted of the defective children, yet those of the normal children were not recorded, and in trying to trace the effects of time on any signs, one has to deal with the whole number seen as a standard, and requires the ages of the whole number seen for a correct solution. The want of this

[2] See *Journal of the Royal Statistical Society,* vol. lvi (1893), p. 71, and vol. lix (1896), p. 125.

record prevents much practically useful knowledge being got from the results, because in examining any groups at school ages the first factor of importance is the age distribution. Time, measured in years or even months, may develop or wreck nervous systems at these ages.

By Dr. Warner's method of dividing the children observed into four main classes, into which the defective conditions observed may be grouped, and then showing the corelation of the various defects, effects can be traced which would elude notice in any other way. To make the observations requires an expert observer, but for practical purposes such complete experience and training is not necessary. In a well regulated school the worst section of a standard will not present more frowning, straining, anxious looking faces than the best section of the same standard in a badly managed or carelessly taught school.

It appears possible thus to assess the discipline and order of a school, "as to order generally, the grant depending on it, this is the "hardest thing we have to assess. It depends on so many nice "balances and considerations. As a rule, indeed, teachers and "taught are mutual mirrors, and reflect each other; but though a "practical expert can detect at a glance all that is overtly dis-"orderly, he cannot on the day of inspection, when all is swept and "garnished, and the children are constrained to order by the very "fact of the examination itself, so easily discover, except in the "very best schools, where the enthusiasm of the teachers and the "vivid interest of the taught speak for themselves, how far the order "is of that high character which the Code exacts, and the instruc-"tions describe and illustrate." (Mr. Brodie's Report, 1896, p. 26.)

Examination days are now wisely abandoned, but Warner's methods, even on the most carefully prepared for occasion, would be an aid which none could now afford to be ignorant of. The result of teaching modified by his ideas would save much waste of effort and time. "Loss of time in schools is a serious matter. "Few sights are more beautiful than a really well conducted "class. I have seen books apparently collecting themselves, "swiftly and almost with the silence of snow. In such a class it "is delightful to follow the underlying soul of honest methodical "teaching, as it is painful to grope after the reverse." (Mr. Synge's Report, 1892, p. 80.) Such attainments mean well regulated nervous systems, which coincide with a relative absence of abnormal nerve-signs in the physical observation of the school or class.

Defective Children.

With regard to those children kept regularly away from school, General Moberley, before the Commission on Blind, &c.

(22012—22156), said that in London at that time there were known to be 20 idiots attending and 435 not attending school; under the head of those under 13 years old and permanently disabled were about 3,000, of whom 2,358 were not and 596 were attending. There were 14,259 children unaccounted for after all deductions from the 605,337 scheduled. Dr. Warner also gave evidence (19087—19101) as to children capable of being taught, yet being kept from school, "such cases as children who occasionally "have slight epileptic fits, perhaps three or four in their lifetime; "cases of slight chorea; cases of children who suffer from repeated "sick headaches, especially when attending school, and who, upon "that ground, are exempted; children whose nervous system is "completely exhausted, and appears to have been so for months "or years; cases of paralysis, of defective development from "birth; cases of defective development of body, with slight "defect of brain (not idiots); cases of nystagmus; cases of "squinting; cases of myopia; cases of rickets, especially seen "about the head with frequent coincident nervous symptoms; "and cases of diseased heart and lungs; these cases seem to "require an exceptional method of education."

The Commission recommended (p. cvi), "That with regard to "feebleminded children they should be separated from ordinary "scholars in public elementary schools, in order that they may "receive special instruction, and that the attention of school "authorities be specially directed towards this object." There is no doubt that this class of children improves much by education. The imbeciles at Lancaster, according to Shuttleworth's estimate, only show 15 per cent. not improved, whilst 40 per cent. benefit to the extent of learning to read and write, and between 15 and 20 per cent. can afterwards earn their own living.

The scheme for the education of the feebleminded is the same as for the slightly imbecile. Their physical imperfections must be remembered, a large proportion being due to low vitality; this low vitality comes out strongly in the comparative death-rates which Shuttleworth gives for imbeciles and for general population, nearly in the ratio 4 to 1.

Death-Rates.	Ages.		
	5—10.	10—15.	15—20.
Imbeciles	50·0	34·0	45·0
General population	6·0	3·3	4·8

Their faulty habits must be gradually eradicated; some few are very dirty; their sensibilities are subnormal as a rule, and one

of the first methods for improvement is to train the touch; on the other hand, with defects of the higher parts of the brain, which may take the form either of dulness, generally or in particulars, or of wayward moral traits, the sensibility and handwork may be especially good.

Moral training by kindness and a primary differentiation between right and wrong, with the doctrine of punishments and rewards, gives the best results, but in practice it does not always work out sufficiently well for educational purposes.

Plenty of free playing, unobtrusively supervised, is useful, and the teacher will not improbably want emancipation from educational instincts developed in accordance with tradition and the Code. Speech should be carefully regulated and trained, and physical exercises for the first few months set up as the chief work of school; then occupations to develop observation and sensibility—stick laying, bead threading, paper plaiting. These children are as imitative as monkeys, and this can be turned to great use in their training. The chief difficulty will be in developing self control. To get a dozen to stand in a line, or to sit quietly in their seats for a minute may take weeks, so that great patience is required. In attempting to impart any ideas the abstract must be avoided, and concrete representation employed wherever possible.

The provision of "classes for special instruction" entails a slight increase in cost, a special room is required, and a special teacher; and then, to form a class of from twelve to twenty but not more children, several schools must be grouped, and some of the children will possibly have to travel a considerable distance.

The numbers of these children are difficult to estimate. Probably accommodation for 2 per cent. of the registration, excluding infants, in any district would not be excessive. The report on 100,000 (cap. ix, 2) says these cases appear to be not more than 1 or 1½ per cent. of the number seen; but it must be remembered that a considerable number would not be in school, being detained at home. In Bradford, where most doubtful children are sent to school in order that they may get to work soon, the estimate formed was 2 per cent. An inspection for other purposes of 10,759 children had 117 noted as undoubtedly defective in brains (Bradford School Board, Eighth Report, p. 3); and this represents much less than the proportion, as in many of the schools the examination of Standard I was omitted. A certain number of such children are allowed to drift through school life, fluctuating between "Standard 0" and attempts at Standard II. When once a child gets out of association with its own years, it seems to lose hope and cease to try, but with most defective children they are

indifferent from the first where they are in school. Of a group collected from neighbouring schools to form a special class, there were 19 children, of average age 11·1 years; all had been years at school; three aged 10, 8, and 12, did not know the alphabet, one aged 13 is noted as "cannot read," four read two-letter words, and the rest were grouped according to their attainments in little words of Standard I reader.

But besides the generally dull there are mentally exceptional, many quite suitable for ordinary school provided the teacher knows their peculiarities. Almost unique cases are found with most *bizarre* defects. Agraphia, for instance, may be unintelligible to a teacher, especially if it occurs, as in one of my cases, in a boy who can do arithmetic well so long as it involves Arabic numerals only, but writes gibberish in a neat hand for dictation exercise; a boy with word blindness, who can spell the separate letters, is a trouble; another who has only since his ninth birthday begun to speak intelligently, although understanding all said; another who is not imbecile, hears well and is dumb. These are extreme cases, but slight cases are also met with, and more frequently faults of speech common up to 8 years usually clear up about that age, but there are curious defects here too. Some are stone deaf; others wanting in ideas of number, although they do other work well; a few have no idea of drawing. It is commonly said that girls as a rule cannot do arithmetic, but this is probably the result of faulty teaching.

In the defective class some have musical capabilities, and others without literary possibilities will yet show great manual dexterity. The capacity for development differs greatly for different mental functions in the same child.

Heredity plays a considerable part in feeblemindedness. Parents drifting downward, both parents and children tend to the workhouse, and in the Poor Law schools (Poor Law Commissioners' Report, 311) Warner noted 8 per cent. dull, and 2·1 per cent. as requiring special instruction. A certain number also drift into industrial schools. Histories come out impressively in individual cases. The males of a family as a rule seem most prone to be affected. In the family of a special class boy rapidly deteriorating, two brothers were still born, three had become insane at the second dentition, and the three sisters were healthy. In one special class there were three families each contributing three sons to the class, and two members of a family are common. A considerable number of children in the classes are cousins. There is a small number of children illustrated by the case mentioned above, probably with syphilitic parentage, who develop cerebral changes, leading to mental dulness where previously bright; the change comes about

the second dentition, and is very obvious to the parents, who blame the schooling for it. From the teachers' notes it almost appears as if a mentally weak mother was commoner than a defective father, possibly mental defect is not such a bar to marriage in a woman as in a man. Sex seems to have some influence. Warner gives—

Sex and Feeblemindedness.

Period ...	1888-91.		1892-94.	
	Boys.	Girls.	Boys.	Girls.
Total numbers seen	26,857	23,143	26,287	23,713
(77) Imbeciles	30	16	3	2
(78) Children feebly gifted mentally	89	85	49	52
(79) Children mentally exceptional	3	9	4	3

which makes the numbers practically the same in both sexes, but the "Report on 100,000" says (p. 57):—

Sex and Mental Dulness.

	Boys, 1,000.	Girls, 1,000.
Dull	82	63
,, and delicate	14	17
,, with nerve-signs	51	38

The experience in the Bradford special classes is that there are about four times as many boys as girls showing defects requiring special education.

The age of any particular case is a matter of importance; unless it be without a shadow of doubt, a case is better kept in an infant department until the eighth birthday. Many children that might be deemed suitable for these classes, at the age of 7, open out wonderfully in the next twelve months. Half the children thought by the teachers suitable for special classes are not yet 8 years of age. The rules which can be invariably applied to schools do not hold for individuals. For individuals the first selection is by the teacher, who reports dull or backward children, but all much over age in their standards should be carefully examined. The *tout ensemble* even in cases where no decided physical defect can be noted is of the greatest importance to a trained observer; but most cases present poorly formed heads (cranial defect), the anterior half of the cranium poor in development and relatively small, frequently accompanied by a forehead of almost hemispherical shape, the central part being most prominent. The ears are often badly

formed, or irregular and without well marked lobes, a highly arched palate is very common, large tonsils, adenoids, and chronic rhinitis with a gaping mouth, and often concurrent conjunctivitis or blepharitis make a child look even more stupid than it is. Congenital cataract or nystagmus is relatively not uncommon. A considerable number also seem to have a laterally curved semi-contracted condition of the little fingers. Three out of four will not follow a movement of the observer's hand perfectly with the eyes but turn their heads (defective eye movements); this, where noted, is a most valuable sign of mental defect. In cases of a low type where there is a shuffling gait, slight muscular inco-ordination, or tremors, or an attitude with all the joints slightly flexed, there is not generally much doubt, but others who are precocious, whose brains perhaps have developed only along one line, and who seem to ultimately be most hopeless, are bold, pert, and unabashed, their friends think them budding geniuses, and are insulted at any proposal to send them to a special class; on the other hand an equally hopeless group are the inattentive children, who are happy and smile inanely all the time, generally also presenting relaxed joints.

The defects which keep these children back in school do not prevent them working for a livelihood; they frequently go as half-timers, but even afterwards when followed up it is found that they cannot keep a place. Defects, lack of self control, which in higher ranks would be merely peculiarities, or even gain a reputation of genius, in the lower may send their possessor to the wall. A person who could exist in a village may be lost in a town, and into the submerged tenth this elimination drives the feeble minded in a ruthless manner, hopeless, unless perchance, drink comes as a friend to end their misery.

In towns where the material is sufficient, such classes should be established as a State duty, as much as is the ordinary school provision by which normal children benefit.

The treatment of children incapable of acting for themselves is no part of our subject; but there are considerable numbers; it would be difficult to estimate the proportion of defective children in rural districts. Some scattered in small numbers in workhouses, others simply neglected at home, who would be better collected and educated at some centre. At present the accommodation is quite inadequate. The Poor Law Commissioners report seven homes with accommodation for 127 girls, and none for boys, as the provision for England. In a case mentioned the applicants for admission numbered ten times the vacancies. Such children would be even better boarded out, and attending an elementary school than in the Poor Law Schools. (Report 320—333.) They really ought to be collected into small homes or certificated

schools, well staffed, to which contributions could be made as in the case of the blind and deaf.

In the recently established day special classes, many children admitted at advanced ages have just begun to benefit when they have attained 14 years of age and gone. For all in a class for twelve months before attaining 14, compulsory attendance until 16 is attained would be an advantage.

A special provision of the cost of transport might be made for all those who have a considerable distance to travel.

The State of Massachusetts has found the saving in school provision effected, makes it economical to pay the carriage to and from school of pupils over wide distances, and provides better and more specialised instruction.

Expenditure on Transport of Children in Massachusetts, 1888-95.

[Report of Commissioner of Education, United States of America, 1894-95, ii, 1474.]

Year.	Sum Expended.	Year.	Sum Expended.
	$		$
1888–89	22,118	1892–93	50,590
'89–90	24,145	'93–94	63,617
'90–91	30,648	'94–95	76,608
'91–92	38,726	'96	—

Nothing has been said about special treatment for children with such diseases as ringworm or favus; in day schools it is not necessary. In Poor Law schools it might be advisable at times to isolate a number of children and educate them apart from the others. The ophthalmia endemic in Metropolitan Poor Law schools is a "home influence" which requires vigorous isolation of the affected. So far as day schools or board schools are concerned it is a trifling affair.

Ordinary school teaching as it is conveyed chiefly through the eye or ear is not available in the case of the two large groups of blind and deaf. The education of these classes is provided for under the Blind and Deaf Act, 1893.

The Deaf.

The deaf form the largest group of the two, and were formerly thought to be idiots. During the last five centuries cases have been recorded of deaf mutes who have ultimately acquired the power of speech. Those who become deaf before learning to speak are naturally dumb also, they are deaf mutes. Any child who has never heard ordinary speech at a distance

of more than two feet will require a special training if it is not to remain dumb. In rare cases a child can speak well, and with the onset of deafness in the course of a few months loses speech. A boy of 6 who could speak well became deaf after mumps, and although attending the infant department of a board school, in a few months lost the power of speech also. Graham Bell noticed that "there are children in our public schools who hear worse "than the best cases of deaf mutes in our own institutions. And "if we could classify the deafness of the whole population we "should find a complete gradation from perfect hearing down to "no hearing at all." (Commission on Blind and Deaf Report, 291.)

The statistics of deafness are unsatisfactory; the commissioners visited the Margate Institution, and reported that 71·3 per cent. of the pupils were congenitally deaf, and 28·7 per cent. had acquired deafness chiefly before 4 years of age. Of the total number 30·5 per cent. were absolutely deaf. The children in the school were members of 674 families, in 67 of which there were 2 or more deaf children. The total numbers of children in these families were 416, and 191 were deaf and dumb. In 6 families both parents were deaf, and they had 27 children, of whom 17 were also deaf and dumb.

The zymotics rank next to congenital as the commonest causes of deafness in childhood. The American census of 1880, taken with great care, gave causes of deafness as—

Meningitis	2,856
Scarlet fever	2,695
Malaria or typhoid	571
Measles	448
Fevers (non malarial)	381
Other causes	2,258
	9,209

These statistics are scarcely applicable to England, because on examining the list of 2,311 cases that have passed through the Illinois Institute there are recorded the causes of deafness, in 1,430, and of these 341 are definitely given as spinal meningitis, a disease on this scale scarcely known in England.

"Personal observations and inquiries in regard to the causes of "deafness in Milwaukee have convinced me that the epidemic "appearance of scarlatina during the winter of 1875-76 is the "cause of the deafness in the majority of cases varying at this "date from 8 to 14 years of age." (Paul Bidder, Wisconsin Schools, 1884, p. 30.)

In 76 institutions for deafness the ages at which deafness began is noted as—

Onset of Deafness.	
Age under 2 years	2,329
,, over 2 years	1,665
Unknown	273
Partially hearing	349
Total of 76 institutions	4,616

(United States of America, Report of Commissioner, Education, 1889-90. II—1,646).

The history given with many children brought to school board deaf classes is that they could hear at first, got as far as speaking a few words, and then became deaf; probably the truth is that they were congenitally deaf, but in early days articulated reflexly tāā or māā as all children do. Had the parents known to direct the child's attention to their mouths from the very first, it possibly would have learned to articulate and lip read as naturally as a hearing child does.

Deaf mutes at school age are in a condition of ignorance difficult to conceive. They must be trained specially either in an institution or a day school. The institution gets them along quickly, but institutions of a residential kind, except for epileptics, are under all circumstances to be avoided for children. The child has everything done for it, it loses the invaluable educational trainings of experience, the necessity for doing which is the mainspring of progress. Day classes are the best, with the children living in their own homes, or else collected from a wide district to attend a central school, and boarded out in separate homes. For this purpose regulations have been issued, Form 1 (B and D), by the Education Department, acting under Sec. 2 (1) of the Act of 1893, The regulations stipulate that there shall not be more than 2 blind or 2 deaf children, or a deaf and a blind child in the same home at the same time; no child shall be boarded in a home more than a mile from the school, unless arrangements be made for the transit of the child to and from school by means of a public conveyance.

Education of the Deaf.—The methods of teaching the deaf hitherto have tended too much to neglect their general educational development, and to train them merely in a means of getting a portion of their livelihood. For children at school age the first is the chief object in view.

The easiest way of imparting ideas is by gestures, and out of that has developed the sign system: letters of the alphabet being rendered by positions of the hand, and abbreviations of sentences, or condensed ideas by conventional signs; this constitutes the

sign and manual system. As many of the deaf are not absolutely deaf, attempts have been frequently made to develop their speech by oral methods used with signs; this constitutes the combined system.

Lastly, there is the method, originating in Spain and France, developed during the past century in Germany, and introduced to England about thirty years ago, of replacing the ear by the eye, and thus teaching articulation, the pure oral method.

The Commission on the Deaf found the numbers being trained in this country to be—

Sign and manual	1,026
Combined system	545
Pure oral system	1,563
Special cases	4
	3,138

The sign and manual system is most objectionable in teaching the deaf to communicate with their deaf fellows, and thus tending to separate them into a class apart from the community; the oral method makes them one with their hearing fellows, and distributes them amongst the ordinary population. The oral method requires the exclusion of all others, it requires greater care at first, and the progress is slow, but afterwards rapid and without limit. About one-third more teachers are required than with sign system; oral teaching ought not to fail except in those with defective brains (certain hearing aphasics) or eyes.

The importance of making the deaf part of the general population, cannnot be overestimated; they have a tendency to intermarry, and heredity is so strong in the production of deaf mutism, that as Graham Bell picturesquely puts it, there is a tendency to form a deaf variety of the human race. With one parent a deaf mute, one tenth of the children are deaf, with both parents deaf mutes, one third of the children suffer (*loc. cit.*, 21,528). Hence there must be rigorous discouragement of all that means collecting the two sexes of deaf together, and even in day schools they should be taught in separate classes.

Age for School Attendance.

The Commission recommended 7 as the age for commencing attendance. I would recommend *as soon as the child can walk to school.*

There is no group in which home influence can do so much to make or mar the school work as the deaf. If the parents to save trouble help the child in all ways, feed and clothe, and make signs to it, the child suffers, and its school education is made much

harder. As previously suggested, the natural time for teaching articulation would be from 2 to 4. The Sarah Fuller Home in Massachusetts only admits children under the age of 5.

It has been fancifully suggested that the deaf are more prone to chest disease through want of full exercise of the lungs, and that deficient oxygenation of the blood leads to chilblains; these defects are due to similar causes common to the deafness. The predisposition to catarrhal conditions, scrofula, is the same which scarlatina lights up in destructive suppuration of the ear. Hospital treatment of scarlatina from prompt recognition of aural complications should ultimately result in diminishing deafness from this cause. The same catarrhal conditions lead to the corneal inflammations so common among the deaf, and the eyesight to them being so important a pot of yellow ointment should be recommended as being as necessary in a deaf school as a filter.

Corneal inflammations, both superficial and interstitial, are common, rhinitis is common, throat and nose defects are associated with the acquired defects of the ears; large tonsils occur, and adenoid hypertrophies really requiring treatment have been noted in about 20 per cent. of the deaf children seen by the writer.

Children should be admitted to the classes at stated times, once or twice a year. A complete medical examination of each one should be made and entered in a special case book. The success of the oral method depends on the teachers; not more than 8 or 10 pupils each. Better salaries are required for the teachers of this expert work.

The class rooms must be well lighted on both sides and from the top, and provided with circularly arranged desks and seats. Boys and girls in separate classes. Plenty of pictures, diagrams, and maps. Black boards round three sides of the room, except where doors or windows are required, extending between two and six feet from the floor. Drawing should be taught to all as a preliminary to manual work. There should be extra training of their hands; drawing, modelling, and manual work must not be omitted.

The Blind.

The blind are a less numerous class than the deaf. Census returns quoted by the Commissioners put the total number at 22,832, of whom 1,710 were of ages 5 to 15. It may be taken that at the very least 2,000 school children are blind. Many of the causes of blindness only come into operation quite late in life: metal from lathes, shuttle accidents, and other injuries leading to sympathetic ophthalmia; optic atrophy, and more rarely malignant myopia leading to detachment of the retina; in later life

glaucoma and cataract are common causes of blindness. The Ophthalmological Society estimated that one third of all the blindness was due to the purulent ophthalmia in infancy; this of course would present a greater percentage at the earlier ages, and probably two-thirds of blind school children have suffered from this easily preventable cause.

In thirty-three public institutions for the blind in America there were due to—

Congenital blindness	520
Not congenital	1,197
Unknown causes	94
Not totally blind	948
	2,759

["Report, Commissioner of Education, 1889-90," p. 1660.]

Much is now being done to prevent the ophthalmia neonatorum, much might also be done to prevent the blindness from infectious ophthalmia which crops up in unhealthy and overcrowded tenements; and the opacities and milk spots following the generally neglected corneal ulcers. Children actually blind should wear goggles to protect against dust and cold, especially if there is any shrinkage of the globe, or any superficial irritation, also to protect them from the exceedingly unpleasant habit so many develop of picking their sightless eyes.

Blind children, for educational purposes, are those too blind to be educated in an ordinary school and do the usual work. Before the school board classes were instituted they were generally taught in institutions, with the result that the institution fending for them, they lost self reliance and sunk to a condition of dependency. They are best taught in day schools, and as they are awkward pupils to teach with large classes, they are best taught in special "blind classes," the sexes being separated in the classes. No very special training is required in the case of teachers for the blind, but as in the case of the deaf, where hearing teachers are necessary, so with the blind, sighted teachers should be required. There are very able blind teachers, much liked by their pupils, with whom they can sympathise, and whose difficulties they have themselves realised; but if employed for teaching it should at least be in association with sighted persons. The only special knowledge required is acquaintance with the types used. There are several kinds, but uniformity is approaching, and the Braille, which is more compact, easily read, written with a frame, and also adapted for musical notation, is the one now generally taught. These

children readily learn to use a keyed typewriter. A small typewriter, with a few symbols in raised blind type, with indiarubber types, is sold very cheaply, and readily learned by them.

The sensibility of the finger tips of blind people is said to be extraordinary, but testing with an anæsthesiometer shows that there is scarcely any difference from that of sighted persons; it is the intellectual appreciation and interpretation of sensation, form, and texture gained by practice which they have more than the sighted, and it is this which can be so well trained in these classes by manual work.

Cold, which affects the cutaneous circulation, also affects the sensibility, so that on a cold day in a badly heated room a blind class may not be able to do any literary work; an even temperature of 62° F. is required. There is a further form of facial sensibility noticeable to the blind, probably present in all to some degree, which is such that objects above a certain height can be distinguished; a blind person by this means may be able to distinguish a lamp post, but yet walk against a low gate.

Physical Training.—Both blind and deaf require physical exercises regularly carried out, to include regular breathing exercise. In the case of the blind ones drill is not sufficient, they require a gymnasium training with apparatus, and preferably in the company of sighted children, to inspire them with confidence and self reliance; they must be kept constantly at work "to "prevent the promotion of bad habits in the use of their hands "and other tricks to which they are liable," as Mr. Sharpe has noticed.

The blind children require no special educational code; they can be expected to do ordinary standard work, and then in later years of school life might with advantage be transferred to an institution for purely technical industrial training. Loss of eyesight is intellectually not such a deprivation as hearing. Blind men have distinguished themselves in every way. We have seen a blind Cabinet Minister riding on horseback on one day, and stroking a crew on the river on the next.

As in the case of the deaf, the class rooms for the blind require well lighting from the top and both sides, "in order to enable the "teacher to see, in the case of the blind, every change of facial "expression, and in order that, in the case of the deaf, the "teacher and scholars may observe clearly the action of the lips."

Unsuitable Cases for Special Schools.—There remain a few children who are not fitted for any of these classes: children for instance with two or more senses defective; fortunately they are very rare. A deaf blind child is only suitable for a blind institution, and then, when there is an able brain behind the closed doors,

as in the celebrated case of Laura Bridgman, education can do much. With defective intellect a blind or deaf child is only suitable for an imbecile institution; a deaf one may be the cause of much wasted time in a class if the combination of defects is not made out by a careful medical examination, and even then it may take some months to make a suspicion into certainty.

The wants and education of these comparatively small classes of deprived children have been dealt with at length. The reasons for this are well summarised in the report of the Commission, Sec. 7.

"The blind, deaf, and dumb, and educable class of imbeciles "form a distinct group, which, if left uneducated, become not "only a burden to themselves but a weighty burden to the State. "It is to the interest of the State to educate them so as to dry up "as far as possible the minor streams which ultimately swell the "great torrent of pauperism. The commissioners report such "afflicted ones as generally poor, but not through any fault of "their own; to relieve them liberally, either in early education or "maintenance, is offering no reward to vice, folly, or improvidence."

Such is a summary of the problem presented by these exceptional children, whose school treatment has been sketched.

Medical Inspection.—For efficient school oversight, especially in the directions in which recent legislation has been tending, medical knowledge is required.

The only general medical inspection of children on a large scale at present carried out is that under the Factory and Workshops Act, 1891, sec. 19. Taking the figures for the year ending 31st October, 1893, we find from the annual report the numbers inspected:—

Young persons:	Males	133,672
„ „	Females	101,922
Children:	Males	29,720
„	Females	28,394
	Total	293,708

Of these there were rejected 4,464, the reasons given being;—ill health 1,383, unclean 129, not provided with necessary papers and other causes 2,952. This gives 1 in 211 rejected on account of health. If the schools were under proper medical supervision, and the children had to be certified from them, there would be much increased school attendance, and more numerous rejections amongst the candidates for the mills.

Questions are constantly arising which cannot be justly settled by any but a medically trained observer with experience of school work. It may be right in individual cases, as part of the whole

school, to test the vision, or hearing capacities, and notify defects to the parents in these cases, or in the cases of adenoids or skin disease; for school purposes it may be well to say that a child must be excused from drill, from drawing, singing, or writing as the case may be, but there the school doctor's duties to the individual end. Yet he sees constantly pitiful ignorance or prejudice in the parents, causing suffering to their children, astigmatic children with headaches because "father does not "believe in spectacles," children growing up stunted, poorly nourished, deaf, and flat chested from adenoids, because their mothers are "again operations."

But apart from individuals, there is a great field for observing and recording bare dry facts, which take much time to collect, and more to analyse.

The best example of such work in English schools is Dr. Warner's inspection, work which wants extending in many ways. The facts regarding the proper growth of children under various conditions, the development of their brains, senses, and muscles are not yet understood even imperfectly.

The effect of town life in destroying or preventing the development of reserve powers, as in the defective respiration, probably protective in the first instance, but leading to defective oxygenation of the blood, low nutrition and stunted growth (hypoplasia), are instances of questions locally and generally important to the community.

Requiring in many points technical knowledge possessed only in fullness by a thoroughly trained medical observer, such knowledge should be at the service of every school board. Abroad the school doctor is a regular official. In Paris, for instance, since 1881 there has been a school physician to every 20 or 25 schoolrooms, and now 128 school divisions are each under separate school doctors. Since 1887 medical inspection has been obligatory in all French schools.

Various proposals, especially at epidemic times, are made for the weekly or even daily medical inspection of all school children, but such are preposterous, because of the cost and time to the doctor, the interference with school work, and the trifling gain to be derived in the special directions required.

The hygienic study of ordinary school children is only beginning. The outcry of 1884 about overpressure was without real basis, and can only be termed an agitation by unscientific observers. But such effects, fatigue of muscle or brain, are capable of comparatively exact study in the school room as well as in the psychological laboratory.

The evil effects of the home, uninfluenced and too often

neglected by other agencies, would to some extent be acted on by the medical inspector in the school, for good. Morally and physically the homes will be improved as the school children are accustomed and educated to clean, beautiful and well ordered schools, and inspired with an abhorrence of hot foul air and stuffy rooms, intolerance of diseased conditions and vermin, and above all a sense of powers that require mastery, a confident self control, and a feeling of citizenship in this world, beyond which there is no other good to be desired by the State from its schools.

MISCELLANEA.

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I.—*Miscellaneous applications of the Calculus of Probabilities.* *By* Professor F. Y. Edgeworth, M.A., D.C.L.

Bimetallism, and Bees, the preponderance of one sex in our nurseries and one party in our parliaments, such are the diversified subjects to which I attempt to apply the universal laws of Probability.

I. Bimetallism rests partly, not to say mainly,[1] on the argument that the value of the compound standard is likely to be more stable than that of either component; the disturbances proper to each metal tending to compensate each other. Common sense approves this argument as right in direction;[2] but to ascertain its force there is required the Calculus of Probabilities. The scientific test may be applied at two stages of the reasoning: (1) to the argument in its

[1] "I think it may be said of the English bimetallists, at all events, that they have always put in the forefront the general stability of prices as their main object."—Professor Foxwell, in his evidence before the Royal Commission on Agricultural Depression. *Q.* 23839.

[2] The only serious objection to the general principle with which I am acquainted is the one raised by Mill (*Political Economy*, book iii, chap. x): that with a double standard changes would occur oftener. This objection is not sustained by the Calculus of Probabilities. Slight variations in the value of money are continually occurring (*cf.* Professor Sidgwick, *Political Economy*, 1st edit., book iii, chap. iv, sec. 6, note); observable, say, from year to year. But each yearly variation does not constitute an independent observation in the sense generally presupposed in the Theory of Errors. As explained below (p. 690), an independent fluctuation—a complete wave, as distinguished from mere ripples—often occupies many years. Now if the number of such waves were increased—even though the magnitude was diminished—this might well be a reproach to bimetallism; since it sometimes happens in human affairs that one great disturbance is preferable to two smaller ones. But whether this is so with respect to the value of money need not be inquired, for bimetallism does not tend to increase the number of the secular waves, nor yet of the yearly ripples. So *cadit quæstio.*

abstract purity; (2) account being taken of some concrete circumstances.

(1.) Let us first imagine an ideal double reservoir[3] supplied by two sources and not subject to a disturbance of level from any third cause. We might suppose a constant efflux equal to the average influx from the sources. Let these tributaries vary in amount from time to time independently of each other; fed it may be from catchment basins subject to quite disparate meteorological conditions. However, let those conditions agree in this respect, that the range of variation, the degree of irregularity in the supply, is the same for both sources. Lastly, let the average amount supplied by each source be the same. If now this reservoir—which may be supposed of uniform depth—is divided by a watertight partition into two halves each fed by a single source, in what degree will the level of either single reservoir thus constituted be less stable than the level of the total or double reservoir? Or what diminution of instability will attend the change from the single to the double system?

One measure is obtained by answering the question: how often is the disturbance from the average level in one of the separate reservoirs greater than what the disturbance of the total level would become on the removal of the partition; in other words, what is the probability that on any given occasion the disturbance in the level of one separate reservoir would be corrected by the communication with the other?

It will perhaps be a surprise to some to learn that this probability is less than *two-thirds*, not very much greater than an even chance; that the odds in favour of the bimetallic standard diverging less from the normal level of prices, in any assigned year or period, than the gold standard are, under ideal conditions, less than two to one. The evidence of this proposition forms a chain, or rather coil, compacted of diverse strands empirical and deductive; which I propose to set forth in some detail, partly anticipating opposition, and partly by way of introduction to a *second* more important proposition *in pari materiâ*.

There is first the *à priori* mathematical argument. If each of the independent sources is affected by a multitude of independent disturbances, each may be expected, like so many things *in rerum naturâ*, to fluctuate in conformity with a species of the general *law of error*.[4] By hypothesis the species—the characteristic expressing the degree of fluctuation—must be the same for both sources. The deviations from the level in the separate reservoirs will comport themselves like the errors of observation made by precisely similar instruments, or by the same one. The problem is reduced to this: what is the probability that any particular observation is better, nearer the true value, than the value which is obtained by com-

[3] See Jevons's *Investigations in Currency and Finance*, p. 311, and compare the masterly statement of the principle by Professor Foxwell in the evidence above referred to. *Q.* 23838.

[4] See the miscellaneous examples in my paper on "Methods of Statistics" in the jubilee number of the *Journal of the Statistical Society* (1885).

bining that observation with another made under the same conditions, that other being taken at random, say the next that comes? The answer is found to be about $\frac{13}{20}$.[5]

A simple verification is afforded by a class of cases which combines in a remarkable degree easily obtained experiences with readily perceived reasons. I refer to the group or series which is formed by taking digits at random from mathematical or statistical tables. Of the ten digits 0, 1, 2 . . . 8, 9 one will occur as often as the other in the long run. If we consider the series as grouped about its mean value, viz., 4·5, we can readily obtain, both by demonstration and experiment, the probability that any digit which we may have taken will not be improved, in the sense of being brought nearer 4·5, by combination with another digit taken at random. Thus the digit 5 can only be bettered by combination with 4; the combination of 5 with itself or 3 gives a result no better than 5, its combination with any of the remaining six digits gives a worse result. Likewise in the case of 6 there are only five out of ten possibilities in which the result is improved. This reckoning being continued, it will be found that in forty out of a hundred cases no advantage would be obtained by taking on a second observation. The reader can easily verify this proportion by actual trial.[6]

A similar result will be obtained if we take at a time two random digits instead of one, *e.g.*, 73 or 41. The mean of two such numbers will be better than the first alone, when it is nearer the general mean of the whole series, viz., 49·5. Thus the mean of 73 and 41 is an improvement on 73. It can be proved by an *à priori* calculation, and could doubtless be verified by actual experiment, that in about 33 out of 100 cases no advantage would be obtained by taking on a second observation.

These instances are indeed not closely analogous to the one with which we have to deal; since the series of digits does not comply with the *law of error*. Still it is instructive to note that

[5] The normal law of error prevailing, the probability that the mean of two observations (of equal precision) is further from the centre than the first one is, may be written

$$\frac{1}{\pi}\int_{-\infty}^{\infty} e^{-x^2}\left[\int_{x}^{\infty} e^{-x^2}dx+\int_{3x}^{\infty} e^{-x^2}dx\right]dx.$$

Roughly evaluating this integral with the aid of the tables at the end of Demorgan's *Calculus of Probabilities*, I find that the required probability is greater, but not I think much greater, than ·347, = ·35 nearly.

[6] The difference between this example and the normal case (where the *law of error* prevails) in respect of the advantage to be derived from composition is not so great as appears. For in making a comparison we ought to take account of the fact that in the case of the digits, though the mean error is no better 40 times out of 100, it is worse only 26 times. Of the 0's, cases in which neither loss nor benefit results from averaging, allocating seven to the *pluses* and seven to the *minuses*, we have thirty-three *minuses;* a result which agrees closely with that of the preceding section.

even where that law does not hold, our proposition is so nearly verified.

An empirical proof more germane to our case is afforded by the same class of phenomena. I have collected, *aliud agens*, some three hundred figures, each formed by adding together ten digits taken at random. I now write down the first two hundred of these figures in pairs, as thus :—43, 59; 26, 55; 36, 33; 39, 58; 39, 41, &c.; and I note how often the first member of each pair is better than the mean of the two, that is, nearer the mean of the series which is 45. Thus, in the first pair above written 43 is nearer 45 than 51, the mean of the two; but in the second pair 26 is worse than the mean of 26 and 55. Designating the first kind of result by the sign —, the second by +, I write out the signs for the hundred pairs, beginning thus: — + — + + (corresponding to the five pairs written down above). Among these hundred signs I count the number of times that *minus* occurs. That number is 39; in close accordance with the theory.[7]

But why should we employ experiments *in alia materiâ* to ascertain the behaviour of a compound reservoir, when we can have direct experience relating, not indeed to reservoirs themselves, but to the rainfall by which they are fed? The rainfall for several districts and years being given by Mr. Symons, let us combine the figure for one year and place with the figure for another year and place taken at random, and see how often we should be advantaged by thus proceeding to a second observation. The condition that the fluctuation to which each member of the pair is liable should be of the same order,[8] is likely to be particularly well fulfilled by the figures in Table II of Mr. Symons's *British Rainfall* for 1881, giving the rainfalls for fifty years in nine stations, each rainfall expressed as a percentage of the average for the corresponding district.[9] From this table I have taken fifty pairs of figures at random, now letting my pencil fall casually on any part of the table, now holding a ruler obliquely, and copying down the figures which occurred immediately above it. I give, in the annexed table, the actual figures in the order in which they were obtained: 107, 117, 92, 74, &c. Under each pair I write the average of the two observations; and I put a + or a — before that average, according as the result of combining the first of those two observations with the second is, or is not, nearer than the first figure by itself to the mean of the whole series, that is 100. Thus under 92 and 74, which form the second pair of observations, I write 83, being the mean of the two, with a *minus* sign prefixed, because 83 is further from 100 than 92, the first of the original observations.

[7] It should be added that there occurred five 0's.

[8] See p. 682, par. 2, above.

[9] The diagrams given representing the frequency of rainfall given by Mr. Symons, show a general conformity to the normal law of error.

Pairs of Figures, taken at random from Table II of Symons's "British Rainfall for 1881," *and Averages thereof.*

107 117	92 74	95 82	126 95	89 90
−112	− 83	− 88·5	+110·5	+ 89·5
107 114	101 86	105 100	93 97	84 90
−110·5	− 93·5	+102·5	+ 95	+ 87
111 104	119 77	82 106	93 111	126 80
+107·5	+ 98	+ 94	+102	+103
132 122	85 93	124 132	72 113	115 89
+127	+ 89	+128	+ 92·5	+102
102 92	85 95	119 77	88 114	113 152
− 97	+ 90	+ 98	+101	−132·5
132 127	96 83	99 122	106 135	105 134
+129·5	− 91	−110·5	−120·5	−119·5
90 80	126 121	110 121	117 82	95 90
− 85	+123·5	−115·5	+ 99·5	− 92·5
102 84	114 83	103 104	104 110	122 93
− 93	+ 98·5	−103·5	−107	+107·5
84 97	151 67	91 122	102 82	103 85
+ 90·5	+109	+106·5	− 92	− 94
97 110	103 97	101 63	79 125	93 99
−103·5	+100	− 82	+102	+ 96

It will be observed that *twenty-one* times out of fifty a worse result is obtained by proceeding to a second observation.

A second verification[10] is afforded by supposing that we had begun with the *second* member of each series. Upon that supposition it will be found that *fourteen* times out of fifty the level of the double reservoir would have been more disturbed than that of the single one; fourteen and a half times, we may say, as there occurs one 0, one case in which the compound observation is at the same distance from the true mean as the single one.

Putting together the two results we have, as the observed frequency of a worse result being obtained by proceeding to a second observation, 35·5 per cent., almost exactly corresponding with the calculated probability.

I have constructed a fresh example from Mr. Symons's *Rainfall Tables* for 1866-80, which contains the average rainfall for each month of fifteen years, and each of some hundreds of stations throughout the United Kingdom. I have selected ten stations as disparate as possible, Clapton Common, Penzance, Whitby, &c., and for each of them have written down the rainfalls in a particular month for ten not consecutive years—a different month

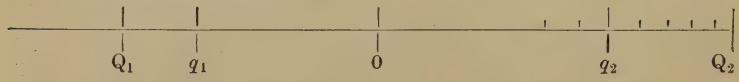
[10] It should be noted that this verification is not entirely *independent* of the other.

for each station. From these hundred figures I take pairs at random, and observe how often the first figure of the pair is improved in the sense of being brought nearer the general mean, viz., 2·68 (inches), by combination with a second figure. I take as the general mean not that of the hundred selected figures, but (as more easily obtained from the book) that of a hundred and fifty figures, which include those hundred, viz., the returns for the fifteen years at each of the ten places (for a particular month at each place). Out of thirty such pairs I find that in *eleven* cases a worse result is obtained by taking on a second observation.

More specific confirmations of our proposition are given by Professor Marshall, to the effect that on two occasions, 1809 and 1816, "violent as were the fluctuations of prices, when the gold price of silver was approximately stationary, they would have been still more violent if we had had universal rigid bimetallism."[11] Whatever the value of this evidence, it derives confirmation from the less specific evidence which we have adduced. The fact which Professor Marshall instances is seen to be just what might be expected, nothing paradoxical or *recherché*. The *à priori* and *à posteriori* evidence confirm each other as usual. The general law increases our confidence in accepting the specific observation; and the specific observation increases our confidence in applying the general law.

To resume, the measure of stability which we have so far employed gives the following result. Under the most favourable circumstances the odds in favour of bimetallism proving of any advantage are less than two to one; the probability that it will prove disadvantageous is about seven in twenty.

But this measure is an imperfect one, since we ought to consider not only the frequency, but also the extent of the advantage conferred by duplication. A more accurate measure is afforded by comparing the dispersion about the mean of the group which is formed by the single observations with the corresponding characteristic for the double observations. Now the measure of this dispersion is reduced by the communication of reservoirs, or composition of observations, in the proportion—not of 2 : 1—but of $\sqrt{2}$: 1. For example, having plotted in the order of magnitude the hundred rainfalls above given in the order of their occurrence, and likewise the fifty figures which are obtained by taking the mean of each pair of monthly rainfalls, I find the following contrast in the grouping of the two sets.



In the annexed diagram Q_1 is the *first quartile* for the uncompounded observations, that is, the point below which a quarter and above which three-quarters of the group occur. Q_2 is the second quartile, for which these proportions are just reversed. The corresponding points for the group of compounds are q_1, q_2. The

[11] Evidence before Royal Commission on Gold and Silver. (*Q.* 9696.)

figure, drawn to scale, exhibits the huddling together of the compound observations. The figures corresponding to the letters are as follows:—

Q_1 is at 89·5; Q_2 at 114. q_1 is at 92·375; q_2 at 109.

Putting 0 for the centre of the observations[12] we have for the *probable error* or deviation—which is proportional to the *standard deviation*,[13] which is proportional to the *modulus*[14]—for the simple observations $\frac{1}{2}(0\ Q_1 + 0\ Q_2) = \frac{1}{2}(114 - 89{\cdot}5) = 12{\cdot}25$; and for the compound observations, 8·312. According to theory the latter measure ought to be less than the former in the proportion $\sqrt{2} : 1$ or $1 : {\cdot}707$; and in fact $12{\cdot}25 \times {\cdot}707 = 8{\cdot}66$, which is not further from 7·68 than might be expected to occur by mere chance.

The same proportion ought to hold between the average deviation, or distance from the centre (= 100), for the simple set and that for the compound set. And in fact I find for the former the average deviation 14·37,[15] and for the latter 9·75. The former figure is to the latter nearly as $1 : {\cdot}7$.

Our second proposition then, the result of a more accurate test of stability, is that in the long run the deviations from the normal level, whether in the way of appreciation or depreciation will be reduced in the proportion $1 : {\cdot}7$ by doubling the standard. As often as any assigned "preciation" (Mr. Courtney's word), *e.g.*, 20 (or 40), would occur under a monometallic *régime*, so often—but not generally at the same epoch—it may be expected that a preciation smaller in the proportion 10 : 7, *e.g.*, 14 (or 28) will occur under a bimetallic *régime*.

This is what happens in the green tree of ideal hypothesis. We have now to introduce several concrete circumstances which complicate the calculation.

(2.) We have so far argued as if the normal influx into the reservoirs was constant. Let us now suppose a secular increase of volume, subject to fluctuations of the level up and down. No change in our propositions will be necessitated, if we suppose the size of the reservoirs to be proportionately altered. The experiments with rainfalls above given would not be affected if the area of the rain-gauges employed in the different stations were enlarged. Similarly, if the production of gold and silver increases *pari passu* with that of commodities—in the long run, though not as to each particular movement—the fluctuation in the value of the precious metals with respect to commodities may be expected to obey the two laws above stated.

The secular increase in the volume of the precious metals

[12] Whether the centre of both sets supposed to be indefinitely prolonged, viz., 100; or the observed *medians*, which are for the first group 98, for the second 100.

[13] The measure sanctioned by the high authority of Professor Karl Pearson.

[14] The term which I have used in my "Methods of Statistics" (above referred to).

[15] Theoretically, if the *law of error* prevails, $14{\cdot}37 \times \sqrt{\pi}$ = modulus = *probable error* $\div {\cdot}477$. And in fact $14{\cdot}37 \times 1{\cdot}77 \ldots = 12{\cdot}25 \div {\cdot}477$ nearly.

would not prevent the direct verification of those laws by comparing the fluctuation of index numbers under a bimetallic and under a monometallic *régime*, were the conditions for such verification otherwise favourable. But a certain indirect verification of the laws, which may be derived from the quantities of the precious metal produced from time to time, is rendered more difficult by the secular increase of volume. Suppose there were no such progress, then the annual production of gold would fluctuate from year to year[16] about a constant mean; and likewise the annual production of silver. Therefore the sum of the gold *plus* the gold value of the silver (converted at a constant ratio, say $15\frac{1}{2}$) would so fluctuate. By comparing then the deviations of one metal with the deviations of the compound, we ought to be able to verify our propositions. It is true that the verification would be indirect, since the variation in the amount of precious metal produced at each period is not identical with the variation in the amount thereof which enters into the currency, and the variation in the amount which enters into currency at each period is not identical with the variation in the total amount of precious metal in use as money. Still, upon the bimetallic axiom that the variations in the supply of the two metals are mutually compensatory, we should be entitled to expect a verification of the kind which has been described.[17]

But when there is a secular increase in the quantities produced, from what *mean* are we to measure the deviations? If indeed the progress were very slow comparatively with the length of the periods at which the successive observations are registered, it might be allowed to treat the quantity produced as constant for several periods. But such is not the character of the best available statistics, those of Soetbeer. If with him we form the total volume in value of the precious metals produced at each period,[18] how can we test the stability of that bimetallic series as compared with the corresponding series for gold alone? All that we are entitled to assume, I think, is that the real mean or norm, the amount of precious metal which ought to be produced in order to keep pace with commodities, is continually progressive. Accordingly, whenever the production of precious metal in any period, as compared with the immediately preceding period, declines, there is likely to[19] be a deviation, or "error," in defect. According to the theory, such errors should be less serious for the compound than

[16] Supposing the yearly fluctuations to be independent of each other. See below.

[17] With respect to the relation between variations in the supply of precious metal and variations in the level of prices, the position of Professor Foxwell appears particularly just. He agrees with Sir R. Giffen that "there is no reason to believe that the proportion of the production of [the] two things to each other regulates the price." (*Evidence*, Q. 2848.) While he presumes that a "joint supply of gold and silver will probably be more stable than a supply of either metal separately. (Q. 23838.)

[18] Using a *constant* ratio, as he has done in his *first* edition.

[19] More than an even chance, but by no means certain, especially when the decline is slight, as at the period 1861-65, for gold.

for the single metal. And indeed we observe that while, out of twenty-six periods recorded by Soetbeer gold is thus in decline ten times, the bimetallic compound declines only seven times. Silver, however, does not present the same contrast with the compound. The failure of one of our conditions, that the average amount supplied by each source should be the same, appears to have proved fatal to the verification. However that may be, a complete verification is not to be expected from such small numbers; and the numbers of independent trials are smaller even than they seem, owing to a second concrete circumstance, which I proceed to introduce.

We have so far treated each observation as independent of its predecessors. The deviation of the level in the reservoirs (from the mean) observed to-day has been supposed independent of the deviation last observed. This might be, if the observations were taken every week, say on Monday, and the vicissitudes of weather are such that after the lapse of a week there is, so to speak, a new sample of weather, if (seasonal changes being abstracted) there is no appreciable connection between the raininess of this Monday and that of the following one (to one who has lived in Ireland the hypothesis does not seem violent). But now let the observations be taken every day. The rainfall of Tuesday will not be independent of Monday's; rather they will be *correlated*. If the level of the double reservoir is more disturbed than that of either half, say No. I, would be, if separate, on a particular day, say a Monday, owing to the prevalence of torrents in the region from which No. II is fed, that relation is likely still to prevail on the following Tuesday. It is not to be expected that a single week's observations should comply with our laws. In the long run, however, they will still be fulfilled; but the run as measured by the number of observations will have to be much longer.

An experiment with digits[20] taken at random may be used as an illustration. If m_0 is the sum of ten such digits, let us form m_1, not by taking ten fresh digits, but by throwing out the first of the original ten, and taking in a new one. Let m_2 be formed by throwing out the second of the original batch of digits and taking in a (second) new one. And so on. For example:—

$$
\begin{aligned}
m_0 &= 1 + 2 + 4 + 1 + 2 + 0 + 4 + 4 + 6 + 0 && = 24\\
m_1 &= \quad 2 + 4 + 1 + 2 + 0 + 4 + 4 + 6 + 0 + 7 && = 30\\
m_2 &= \quad\quad 4 + 1 + 2 + 0 + 4 + 4 + 6 + 0 + 7 + 0 && = 28\\
&\ \ \vdots \qquad\qquad\qquad \vdots\\
m_{10} &= \qquad\qquad\qquad\qquad 7 + 0 + \&c. && = 42
\end{aligned}
$$

The digits here operated with were all obtained random-wise. It does not seem necessary to write them all out here. Starting with a second decade, 29, and similarly varying it, I obtain a second series, n_0, n_1 . . . . n_{10}. The two series and the series of means may be written as follows:—

[20] Sums of digits such as I have instanced on p. 684 would be more appropriate as fulfilling the law of error.

$$
\begin{array}{rl}
m & : 24,\ 30,\ 28,\ 28,\ 31,\ 33,\ 38,\ 42,\ 42,\ 37;\ 42. \\
n & : 29,\ 33,\ 29,\ 28,\ 25,\ 25,\ 32,\ 35,\ 38,\ 41;\ 41. \\
\dfrac{m+n}{2} & : 26{\cdot}5,\ 31{\cdot}5,\ 28{\cdot}5,\ 28,\ 28,\ 29,\ 35,\ 38{\cdot}5,\ 40,\ 39;\ 41{\cdot}5.
\end{array}
$$

The first ten terms of the third series contrasted with those of either of the other two series show little tendency to fulfil the laws which we have investigated. The norm or general mean being 45 (the sum of ten digits taken at random), the compound is only four times out of ten better than the component in the first series, only six times than the component in the second series. The mean deviation for the compound is 12·6; for the first component 11·7, for the second component 13·5.[21]

It would be otherwise if we considered the two series formed by taking the first, eleventh, twenty-first . . . terms of each of the two given series. Each of these partial series consists of *independent* observations, and therefore may be expected to fulfil our laws. The same may be said of the two partial series formed by taking the second, twelfth, &c., terms in each of the given series, and so on. But, if it is true of each of these partial series that the compound is in the long run about seven times in twenty further from the general mean than one component, and that the probable error (mean deviation, modulus, &c.) is for the compound about ·7 what it is for the component, then those propositions must be true of the sum of the partial series, that is, for the original series, *provided we go on long enough.*

It is important to notice that the complete renovation which in our illustration is effected in the course of ten observations, need not have the same period in both series, nor indeed a regular period in either series.

Altogether the two concrete circumstances which have been introduced impair, not the probability of the abstract laws being fulfilled in the long run, but the possibility of their being verified by statistics at present available.

It is otherwise with the next correction. So far we have supposed the level of the reservoirs to be disturbed only by the variations in the supply from the two sources. But the level of the reservoirs depends not only on the volume of the tributary streams, but also on the tides of credit. How are we to compare the magnitude of these two kinds of disturbance? Hear the weighty judgment of Professor Marshall:—

[21] The long wave of change which it takes ten small variations to complete is for a part at least of the period almost as steep as either of the component waves. But the *ripples* of the compound wave would no doubt be gentler; as might be shown by determining the rise both for the component and the compound series of figures by some such method as I have stated in my paper on "Progressive Means" in the *Journal of the Royal Statistical Society* for 1886, and then calculating the fluctuation, upon the analogy of the ordinary method for calculating it, by taking the difference between each actual observation and the mean from which it may be regarded as an accidental deviation: in the notation of the paper referred to, $c^2 = 2\underline{S}^{n}_{n}\left(x_r - (z + rw)\right)^2 \div \left(2n + 1\right)$. As to the monetary interest of this conception, see below, note 28.

"I accept the common doctrine that prices generally rise, other things being equal, in proportion to the volume of metals which are used as currency. I think that changes in the other things which are taken as equal are very often, perhaps generally, more important than the changes in the volume of the precious metals." (Evidence before the Royal Commission on Gold and Silver, *Q.* 9629, first sentence; *cf.* last sentence.)

"What I said before as to the importance of watching changes in the methods of business at least as carefully as changes in the supplies of the precious metals, had for its object to lead up to this, that I do not consider that the main causes of fluctuations of prices have been fluctuations in the supplies of the precious metals. I believe that changes in the methods of business, or as we may say changes in the commercial environment, have much greater effect in disturbing prices than changes in these supplies of the precious metals." (Ibid. 9696.)

If we make the moderate assumption that the fluctuations pertaining to the two kinds of disturbances—the metallic and the fiduciary, or more generally the non-metallic[22]—are equal, the principal question then becomes, how much is the total disturbance reduced by that reduction of the metallic fluctuation which is consequent on the communication of reservoirs? The answer supplied to this question by the Calculus of Probabilities is that the measure of deviation will be reduced in the ratio of 1 : 87, or by 13 per cent. That is all the advantage in respect of stability that we can ascribe to bimetallism upon the suppositions so far made. This statement depends only on the comparative intensity of the fiduciary fluctuation. It does not depend on the relative length of the waves which are superposed.[23] The credit waves may be much shorter, or much longer, than the monetary ones.

To such an extent is our second and more important conclusion made worse by the concrete circumstance which we have just introduced. The modification of the preliminary proposition is less easily ascertained, and I have not taken the trouble of performing a numerical calculation. But it is demonstrable that the modification is considerable; that the odds in favour of bimetallism proving advantageous at any specified epoch, which were less than 2 to 1 on the ideal hypothesis of a metallic currency, will be very much less in the actual *régime* of credit.

The following empirical proof will appeal more forcibly than mathematical calculations to some readers. Referring to the table of random rainfalls given at p. 685, let us take one observation to represent the element of credit,[24] and another observation to represent the element of metallic money; and let us compare in respect of stability the cases in which that second element is single or compound. Thus let 92, the third observation in the table, stand for credit, and let us combine it first with

[22] Due to changes in methods of business, "the commercial environment."—Marshall, *loc. cit.*

[23] See above, p. 690, par. 3.

[24] Using the term as short for the "commercial environment." See note 22.

117, the observation which comes second in the table, and next with 112, the mean of 117 and 107, the first observation in the table. The combination of the credit and metal elements gives us in the first case 104·5, in the second case 102, that is a better value in the second case. Again, let 74, the fourth observation, stand for credit, and let it be combined now with 95, the fifth observation, now with 88·5 the mean of the fifth and sixth. The combination of credit and metal gives us in the first case 84·5, in the second case 81·25, that is a better value in the first case. Observing that three pairs of the observations in the table thus afford two trials of the sort now required, we may obtain from the fifty pairs thirty-three independent trials. Proceeding thus, I find that out of thirty-three trials the bimetallic compound proves advantageous eighteen times, and thirteen times detrimental!

The *rationale* is similar, the weight is less, of the correction next to be introduced. We have so far assumed that the disturbances in the supply of the two metals are independent; but *à priori* it seems probable that improvements in the arts of mining tend to augment both kinds of production simultaneously;[25] and, in fact, the comparative prices tabulated by Soetbeer showing a remarkable decline in the price of *Bergwerks-produkte* as a whole during recent years—a decline greater than in the case of other classes of products—seem to point to a common cause of fall. I have been unable to find more direct evidence of interdependence from the statistics of the production of the precious metals. Out of twenty-six periods recorded by Soetbeer, ten show a decline of gold, six of silver. If the two phenomena were quite independent we might expect the proportion of periods for which both kinds of production declined to be $\frac{6}{26} \times \frac{10}{26}$; that is, the total number out of twenty-six to be either two or three. In fact there are three.

To take another test, the growth in the quinquennial production of gold (or that for a longer period), according to Soetbeer's statistics, changes the sign from positive to negative five times, and from negative to positive five times. The corresponding changes of sign for silver each way are three. The number of coincident changes which might be expected if the phenomenon were independent is twice $\frac{5 \times 3}{26}$; the actual number is three.

Altogether it would seem that some, but only a small, deterioration of our conclusions is to be attributed to the circumstance which has been considered.

Much the same may be said about the next correction. We have so far assumed that the volume of liquid in the component reservoirs, the total value of gold and that of silver in a metallic world, is and will continue, equal. But even admitting that this condition is fulfilled now, there seems no reason why it should continue to be fulfilled. The effect of its relaxation would be somewhat to aggravate the instability of the bimetallic com-

[25] See the interview with Mr. McArthur, the inventor of the cyanide process, in the *Economic Journal* for March, 1897. This high authority allows some, but not much, interdependence between the production of gold and that of silver.

pound. But it is to be remarked that however much the condition may be relaxed there would still accrue *some* advantage from the amalgamation. Suppose that of the total volume of bimetallic money two-thirds consisted of gold, and only one-third of silver. Then if the influence of credit be at first abstracted, the measure of instability pertaining to the bimetallic standard will be increased from ·707 as at first stated, to ·745. But if allowance is made for the influence of credit, the inequality of volumes will be much less operative: the measure of deviation will be raised from ·87 to ·88.

Such is the modification of our fundamental proposition. With regard to the preliminary proposition, the odds in favour of the metal which is more prevalent in the bimetallic world will be increased. Thus, if there should be an inundation of silver expelling a large proportion of gold from circulation, the chance at any assigned epoch that bimetallism will be more stable than what gold monometallism would have been, will be diminished.

Let us next consider what correction is required with respect to the assumption that the gold and silver monometallism standards are equally stable in value. Evidence has been adduced by eminent bimetallists[26] in favour of the greater stability of silver. Professor Marshall however has reached an opposite conclusion; and the authority of Professor Marshall is supported by that of Jevons.

It may be observed that some of the evidence relates to the great waves, and some to the mere ripples. But query if the stability of the ripples much concerns us. If the level of general prices has declined by 30 per cent., for instance, in the period 1885-92, as compared by Mr. Sauerbeck with 1887-8 , it does not matter whether the index numbers for the particular years are almost identical as for 1889, 1890, 1891, nearly 72, or whether superimposed upon the immense wave of depression, there is a little ripple of disturbance as marked in the index numbers for 1886, 1887, 1888, viz., 69, 68, 70, respectively. As Professor Sidgwick has said, "an increase in the number of *slight* fluctuations seems to me quite unimportant, as such changes do not produce in a sensible degree the evils of loss or uncertainty."[27]

It may be admitted that the preponderance of evidence on either side is not very decisive.[28] This datum being so doubtful,

[26] See in particular Prof. Foxwell, *Royal Agricultural Commission*, Q. 23, 838.

[27] *Political Economy*, book iii, chap. iv, sec. 6, first edit.

[28] The evidence may relate either to long waves or to ripples. Thus the bimetallist contention that while gold prices have fallen considerably during recent years, silver prices have not varied seriously, relates to waves, or rather to *one* wave. Professor Marshall presumably refers to ripples when he says (Q. 9700): "When I examine closely the figures from the year 1873 to the present period I find no such parallelism as at first suggested." (*Cf.* Q. 9985.) But the fluctuation considered by him at Q. 9882 is presumably secular.

The very able writer of the note on the "Stability of Prices" in the *Yale Review* for May, 1897, adduces some evidence that the ripple of value for gold monometallism since 1873 is more unstable than the bimetallic ripple before 1873. The evidence is somewhat weakened, as the author points out, by the occurrence of a "variation" as distinguished from an "oscillation" in the value of gold—in our terms a wave, as distinguished from a ripple. The proper way of separating the ripple from the wave is presumably that which has been indicated at note 21.

the best that the Calculus can do is to point out that the matter is not so important as it might seem. On the one hand, even if the stability of silver were enormously greater than that of gold, the advantage of bimetallism over gold monometallism would not be considerably increased by that circumstance. Suppose the instability of gold (as measured by the average deviation of the corresponding index-numbers from the mean or norm) were twice as great of silver. Yet, upon the assumptions above made, the measure of deviation for the bimetallic standard would be reduced from 0·87 (of the measure pertaining to gold monometallism) only to 0·81. Suppose the instability of gold were infinitely greater than that of silver, the latter being perfectly stable. Yet the measure of deviation would be reduced only to 0·79. On the other hand, even if the instability of silver be considerably greater than that of gold—in fact, up to the point at which the instability (as measured by the "modulus," or "standard deviation") of silver is $\sqrt{3}$ times, or nearly twice, as great as that of gold—*some* advantage would accrue to gold from the amalgamation.

The greater the relative instability of silver the less the odds in favour of bimetallism at any assigned epoch being more stable than gold monometallism.

Looking back at the last three corrections, I think it would be a moderate estimate to add on account of them about 0·03 to the 0·87 which we had before found as the factor whereby the "preciation" incident to monometallism is reduced by the adoption of bimetallism. Or might the conclusion be thus expressed more safely? Whereas upon an ideal supposition the instability of the monometallic standard would be reduced by the establishment of the bimetallic in the proportion of $\sqrt{2} : 1$, or by some 30 per cent., this reduction is reduced to some 10 per cent. when account is taken of all concrete circumstances, the fluctuations of credit, the interdependence in the production of gold, the probable inequality for considerable periods of the quantities of gold and silver money, and the possibly greater fluctuation in the value of silver.

One more circumstance—I hesitate to call it concrete, so speculative is its character—remains to be considered. We have so far defined the mean or norm from which deviations of a standard are to be measured by reference to an index number based on the prices of commodities. The standard would be perfectly stable, it has been assumed, if that index number were from period to period 100; it is more unstable according as the fluctuation of the series of such index numbers is greater. But a large body of expert opinion might be adduced in favour of the principle that the ideal level of currency is defined by the condition, not that a pound procures the same quantity of commodities, but that the same quantity of effort and sacrifice is required to produce a pound.[29] Upon this view the disturbances in the value of gold

[29] See the section on "the Labour Standard" at the end of my memorandum on "Variations in the Value of Money" in the *Report of the British Association* for 1889, and compare my "Recent Writings on Index Numbers" in the *Economic Journal* for March, 1894.

and silver could no longer be regarded as independent fluctuations about a fixed mean, say the average quantity of commodities initially or normally purchaseable for a unit of money. Rather the disturbances proper to gold and silver are now to be regarded as superposed on the fluctuation, or constant increase, of an average which was before regarded as constant, namely, a normal quantity of commodities. Upon this view the correction effected by averaging the disturbances proper to gold and silver would not be so great as when the norm is defined by the index number based on the prices of commodities.[30]

A similar "constant error," reducing the advantage of bimetallic combination, might be formed by the tendency of commodities to increase faster than metallic money—a view which has been entertained both in bimetallic and monometallic circles; or if, as I have contended, the tendency is in the opposite direction.[31]

It is impossible to assign a numerical value to the corrections under this last head; but they may well avail to render the effect of bimetallism so small as to be incapable of measurement—falling within the margin of probable error which attaches to index numbers, say some 6 or 7 per cent.

To sum up. Suppose that international bimetallism could be got to work, having surmounted all the dangers which threaten its infancy, the scramble for gold, the inundation of silver, the evasion of business men "contracting out" of the bimetallic money, and other risks which it is not within the province of the Calculus to evaluate, then the advantage in the way of stability of value to be expected from bimetallism would be of the following description. It would not necessarily, nor even very probably, be reaped at once. The proximate effect of the reform might be to aggravate the evils complained of; supposing of course that the "ratio" between gold and silver is fixed not with the view of producing a temporary inflation, for instance at present at $15\frac{1}{2}$, but, as claimed by scientific bimetallists, with the view of securing stability under future disturbances, say the present market ratio.[32] If that ratio is adopted, it is a quite possible event—the odds against it are much less than two to one[33]—that when the next wave of monetary disturbance supervenes, the operation of bimetallism may be to aggravate not to alleviate the monetary *malaise*. A generation, two generations, may pass away before the advantages of the reform begin to be realised. But let the reformers only persevere,

[30] A similar, though probably less serious, modification of our estimates is required so often as any other kind of index number than the one which is based on the prices of commodities is taken as the ideal.

[31] See "Thoughts on Monetary Reform," sec. ii, *Economic Journal*, 1895.

[32] *E.g.*, by Mr. Leonard Courtney.—*Nineteenth Century*, April, 1893. The statement on the text about the *next* wave of disturbance remains true, even if some other ratio is adopted.

[33] Above, p. 691. It may be observed that the statistics of our ideal reservoir (p. 685) start with three *minuses*, that is, for the first three trials the bimetallic amalgamation causes detriment. In the monetary world a "trial," a complete wave (above, p. 689), seems often to occupy a quarter of a century. A sequence of four minuses is not unprecedented, even in the ideal system.

and in the long run there will undoubtedly be realised upon an average of centuries a reduction of those deviations from the ideally best level of prices which from time to time are liable to occur. If once a century, with the uncorrected standard, men suffered an appreciation of 40 per cent. once a century, though not in the same years, with the corrected standard they might expect to suffer an appreciation of say only 38 per cent.

That is assuming the proportion in which "preciation" is reduced by bimetallism to be (1 :) ·9. This assumption appears moderate in the light of the preceding discussion. It is mathematically certain that the factor is at least ·7. It is practically certain that the figure is raised considerably above that ideal limit by several concrete circumstances making for a rise. Upon speculative principles, which are very tenable, the factor may well exceed 0·9.

This reasoning is not directed against the *second* great prop of bimetallism, the advantage of establishing a par of international exchange. These advantages are to be estimated by political economy in the light of ordinary statistics rather than by the Calculus of Probabilities. However, one of the theorems above employed may have some bearing on this part of the subject. So far as the fluctuations in the exchanges due to the variations in the supply of bills are commensurate with those due to the variations in the relative value of the precious metals, the connection of the latter disturbance will not confer so much advantage as might be supposed. Suppose the two kinds of fluctuation to be equal (and independent). The cessation of the latter will not reduce the instability by a half, but only in the ratio $\sqrt{2} : 1$. It is to be considered moreover that much of the evil ascribed to variation in the relative values of moneys at different places is traceable to variation in the value of money in relation to commodities at different times. The detriment accruing to the manufacturer in gold using countries from the appreciation of the standard while debts and other outgoings remained fixed, is said to be aggravated by the circumstance that his rivals in silver using countries are not similarly weighted. This argument, however right in direction, loses in force if it is true, as maintained in the preceding paragraphs, that the correction of the fluctuations in the value of money from time to time which is to be expected from bimetallism is less important than has been generally supposed.

(II.) From these contentious themes it is a relief to turn to an industry which has not been perplexed by economic controversy. The busy bee goes through her round of operations with a regularity which affords an interesting study in statistics. It is not, indeed, quite true that "she gathers honey all the day." She spends a part of each shining hour not in gathering, but in seeking, and carrying, and storing, the precious fluid. Some methods of ascertaining the duration of these operations have been given by me in a former paper referring to wasps. The easiest method of measuring the mean periodic time of an excursion or voyage, it may be remembered, was as follows: Observe the times of the n exits last before nightfall, and also the times of the last n en-

trances, n being large; the difference between the sum of the latter set of observations and the sum of the former set divided by n gives the average duration of a voyage at eventide.

I have applied this method to a nest of bumble bees of the species *Bombus Hortorum* in a garden appertaining to a house in Norham Gardens, Oxford. Their exits and their entrances were observed by me on the evening of 29th June, 1897, from 6.25 p.m. up to 8.41 p.m., when the last entrance occurred. During that period there were in all 166 exits; the last 166 entrances occurred after 7.1 p.m. The sum of the times of entrance, reckoned in minutes from 6.25 as zero, proves to be 13,002. The corresponding sum of times of exit proves to be 7,511. Whence, for the mean duration of a voyage, we have $(13{,}002 - 7{,}511) \div 166 = 33$.

The worth of this average is shown by the fact that (almost) the same result continues to be obtained while the number of observations is varied. The mean time calculated from the last 100 observations is still 33. Calculated from the last 70 observations it is still 33. Calculated from the last 50 it is 32.

A further verification is afforded by the fact that the interval between the moment when the first of the 166 exits occurred by 6.25, and the moment when according to our hypothesis the bees who went out at that moment should (on an average) have returned, the moment at which the first of the final 166 entrances occurred, viz., 7.1, was 36 minutes. Similar confirmations are afforded by the batches of 100, 70, and 50 observations.

To test and extend the generalisation, I made a summary observation on the same nest on a subsequent evening, that of 2nd July. Beginning at 7.15, I observed in all 52 exits. The sums of the times of the last 52 entrances reckoned from 7.15 as zero was 2,783, the corresponding sum of the times of exits was 1,304 $(2{,}783 - 1{,}304) \div 52 = 30$ (nearly). The first of the final 52 entrances occurred 35 minutes after the final 52 exits.

It would be interesting to determine for wild bees, as I have done for wasps, whether the midday voyages are on the average longer than the evening ones. The possibility of such a calculation is deducible from the statistics just referred to. From the time when I began to observe on the evening of 29th June, viz., 6.25 p.m., up to the time of closing, there occurred 232 entrances. Now since the last 166 of these, which occurred between 6.25 p.m. and closing time, correspond to the last 166 entrances, which occurred after 7.1 p.m., it follows that the 66 entrances between 6.25 p.m. and 7.1 p.m. correspond to exits before that epoch; had the gates been closed at 8.25 there would have been excluded just 66 bees. Also at that period there was a steady flow of 1·9 per minute; 70 exits and 65 exits having occurred in the 36 minutes from 6.25 to 7.4 p.m. Accordingly by the now familiar formula we have for the duration of an average voyage $66 \div 1{\cdot}9 = 34$; fairly well corresponding with the result obtained by another method. The method of exclusion then is applicable; but unfortunately my leisure has not yet coincided with an occasion in which the flow of bees has been sufficiently large to warrant the application of this method.

I have applied the evening method three times to honey-bees (*apis mellifica*). At a hive in North End, Hampstead, on the 18th July, I found for the mean time of a voyage 11 minutes, a result based on 125 observations of exit (and entrance). Calculated from the last 70 observations, the time was 9·5 minutes; calculated from the last 50 observations, it was 9 minutes. For a colony of honey-bees in the roof of the Rectory at Winchfield, I found, 1st July, from 186 observations, 8 minutes as the mean duration of a voyage; from the last 100 of these observations, 7 minutes. From observations on the same colony, 5th August, consisting of 47 exits (and 47 entrances), I found 10 minutes for the mean duration of a voyage.

The inference seems to be inevitable that the evening voyage of the honey-bee is considerably shorter than that of the bumble,[34] and even somewhat shorter than that of the wasp.[35]

Some doubt, however, on the numerical precision of the inference is excited by an observation which I made on the same colony on the morning of 9th August. Between 4.30 a.m. and 5.30 .a.m there occurred 25 entrances, but only 15 exits. It looks as if some few of the bees who went out on the previous evening did not come home till morning.[36]

Ascending in the order of creation, I will take my next study from the vital statistics of man.

(*To be continued.*)

II.—*On the Calculation of the Average Square, Cube, &c., of a large number of Magnitudes.* *By* W. F. Sheppard, M.A., LL.M.

I.

Suppose that a number of measurements are taken to the nearest multiple of a particular unit, thus:—

Chest Measurements, to the nearest inch, of 5,732 Scotch Soldiers.[37]

Inches.	Number.	Inches.	Number.
33	3	41	935
34	19	42	646
35	81	43	313
36	189	44	168
37	409	45	50
38	753	46	18
39	1,062	47	3
40	1,082	48	1

Let X denote the *true* average chest measurement of these 5,732 men. Then the data do not enable us to measure X exactly. If we obtain a *rough value* by taking each man's measurement as equal to the nearest multiple of an inch, and calculating the average on this assumption, we know that this rough average is within

[34] Above, p. 697.
[35] *Journal of the Royal Statistical Society*, 1896, pp. 370—81.
[36] *Journal of the Royal Statistical Society*, 1896, p. 378.
[37] *Edinburgh Medical Journal*, vol. xiii.

½ inch of X. But this is not close enough for some purposes. If M is the *most probable* value of the average as given by the data, the theory of error shows[38] that the "probable error" due to taking M as the true average is ·003 inch; in other words, it is an even chance that X lies between M − ·003 inch and M + ·003 inch. Moreover, X is not wanted for its own sake. The data are regarded as constituting a random selection from an indefinitely great "community," and what we really require is the average chest measurement for this unknown community. If x is this unknown average, then X, if we could find it, would be the most probable value of x. Since we cannot find X, we have to take M as the most probable value of x. The theory of error shows (by a well-known formula) that the "probable error" involved in doing this is ·018 inch; *i.e.*, it is an even chance that x lies between M − ·018 inch and M + ·018 inch. Hence it is of some importance to be able to calculate M within at most ·018 inch of its true value.

This, in the particular case, is easily done. In the first place, the data indicate that the figure of frequency in the complete community is continuous; and, in the second place, the increments which determine the successive classes are of a constant value (1 inch). Hence the Euler-Maclaurin formula—better known to actuaries as Woolhouse's formula—shows that M can be found by taking each man's measurement as equal to the nearest multiple of an inch, and adding certain terms, which depend on the "differences." Moreover, the figure of frequency in the present case tapers off gradually in both directions, and therefore these additional terms are negligible.[39] It follows that the most probable value of the average is practically the same as the "rough value" mentioned above.

This can be tested by exhibiting the data in different ways. The rough average obtained by the above method is 39·849 inches. If now we arrange the data thus:—

Chest Measurement.	Number.
Between 31½ inches and 33½ inches	3
,, 33½ ,, 35½ ,,	100
,, 35½ ,, 37½ ,,	598
,, 37½ ,, 39½ ,,	1,815
,, 39½ ,, 41½ ,,	2,017
,, 41½ ,, 43½ ,,	959
,, 43½ ,, 45½ ,,	218
,, 45½ ,, 47½ ,,	21
,, 47½ ,, 49½ ,,	1

[38] The formula is ·19471 $h \div \sqrt{n}$, where h is the unit of measurement, and n is the number of individuals. Similarly the "probable error" in the *sum* of the n values is ·19471 $h \times \sqrt{n}$. If, for instance, we add together the logarithms of 400 numbers, each logarithm being taken to seven places of decimals, there is a "probable error" of ·00000039 in the result.

[39] In cases where the figure of frequency starts or ends with a finite ordinate, *e.g.*, in the case where the quantity measured is the duration of life, the additional terms are not negligible. It is therefore rather difficult to see why, in forming the Institute of Actuaries' Life Tables, these terms have been omitted. The table at p. 6 of the Life Tables does not really give the "average duration of life," but the value of ·5 + a, where a is the present value of an annuity 1, the rate of interest being zero.

and take the measurement for every man in each class as equal to the arithmetic mean of the two measures which determine the class, it will be found that the rough average becomes 39·851 inches. This only differs from the former result by ·002 inch. Similarly if we arrange the data in classes proceeding by differences of 2 inches from $32\frac{1}{2}$ inches to $48\frac{1}{2}$ inches, the rough average will be 39·847 inches. Allowing for the probable error of ·003 inch, we may take it as highly probable that the true average, to two places of decimals, is 39·85 inches, and it is then (roughly) an even chance that x, the average in the community from which the data are obtained by random selection, lies between 39·83 inches and 39·87 inches.

II.

A similar difficulty arises if we require the average square, average cube, &c., of the given magnitudes. We cannot determine the *true* value of any of these averages, and therefore, as in the case of the simple average, we have to content ourselves with the *most probable* value. As before, we can obtain a *rough value* by taking every measure in each class as equal to the arithmetic mean of the two measures which determine the class. But this rough value will not (except in certain special cases) be the same as the most probable value. A correction is required, which is obtained from a general formula which need not be given here. The most important cases are as follows:—

Let n denote the total number of individuals, S_r the *rough value* of the sum of the r^{th} powers, measured from any arbitrary zero, and S_r' the *most probable* value of this sum. Also let h be the constant difference which determines successive classes in the data; thus in the example taken above h is 1 inch. Then

$$S_1' = S_1.$$
$$S_2' = S_2 - \frac{1}{12} nh^2.$$
$$S_3' = S_3 - \frac{1}{4} S_1 h^2.$$
$$S_4' = S_4 - \frac{1}{2} S_2 h^2 + \frac{7}{240} nh^4.$$
$$S_5' = S_5 - \frac{5}{6} S_3 h^2 + \frac{7}{48} S_1 h^4.$$

Hence, if μ_r denotes the rough value of the average r^{th} power of the deviation from the average, and μ_r' the most probable value of this average,

$$\mu_1' = \mu_1 = 0.$$
$$\mu_2' = \mu_2 - \frac{1}{12} h^2.$$
$$\mu_3' = \mu_3.$$
$$\mu_4' = \mu_4 - \frac{1}{2} \mu_2 h^2 + \frac{7}{240} h^4.$$
$$\mu_5' = \mu_5 - \frac{5}{6} \mu_3 h^2.$$

It is to be understood that these formulæ only apply where (α) the difference h is a constant, (β) the figure of frequency is practically continuous, and (γ) the figure tapers off gradually in both directions. Where (β) and (γ) do not hold, there are certain terms, depending on the differences, which ought to be introduced. The first two of the following examples show how small these neglected terms are in cases of the kind we are considering. In the first of the two the selection is a "representative" one, *i.e.*, numbers are taken which are exactly proportional to the numbers in the corresponding classes of a community having a particular curve of frequency; and the rough value, and the corrected value as given by the above formulæ, are compared with the most probable value on the assumption that the curve of frequency is that stated. In the second example the selection is approximately representative, the numbers taken being the nearest integers to the true proportionals.[40] The remaining examples are taken from actual observations, and the accuracy of the formula for the correction in the average square is tested by comparing the different values of the "standard deviation" (square root of average square of deviation from the average) obtained by exhibiting the data in different ways. In each case the "probable error" in the standard deviation is stated; *i.e.*, the probable error due to taking the calculated standard deviation as the true value of the standard deviation for a community from which the data are supposed to be obtained by random selection.

(i.) Curve of frequency $z \propto (x + 4\frac{1}{2})^5(5\frac{1}{2} - x)^6$.
Number of individuals $= 10^{12}$.

Representative Selection.

$x = -4\frac{1}{2}$ to $-3\frac{1}{2}$	541,231,822
$-3\frac{1}{2}$ „ $-2\frac{1}{2}$	18,864,047,410
$-2\frac{1}{2}$ „ $-1\frac{1}{2}$	98,443,459,630
$-1\frac{1}{2}$ „ $-\frac{1}{2}$	216,942,703,570
$-\frac{1}{2}$ „ $\frac{1}{2}$	278,001,526,318
$\frac{1}{2}$ „ $1\frac{1}{2}$	228,994,738,642
$1\frac{1}{2}$ „ $2\frac{1}{2}$	119,611,449,550
$2\frac{1}{2}$ „ $3\frac{1}{2}$	34,697,711,410
$3\frac{1}{2}$ „ $4\frac{1}{2}$	3,852,951,310
$4\frac{1}{2}$ „ $5\frac{1}{2}$	50,180,338
Total	1,000,000,000,000

	$S_1 \div 10^6$.	$S_2 \div 10^6$.	$S_3 \div 10^6$.	$S_4 \div 10^6$.	$S_5 \div 10^6$.
Rough value	115,387	1,871,774	827,127	9,429,592	8,085,022
Corrected value	115,387	1,788,441	798,281	8,522,872	7,412,576
Most probable value	115,385	1,788,462	798,077	8,524,038	7,405,402

[40] It will be seen that in this example the approximation given by the formulæ is closer than in the preceding example. This is due to the fact that the "tails" of the figure of frequency are (relatively) longer.

(ii.) Curve of frequency $z \propto e^{-\frac{1}{4}(x-\cdot 2)^2}$.
Number of individuals = 88,622.

Approximately Representative Selection.

$x = -6\frac{1}{2}$ to $-5\frac{1}{2}$	2	$\frac{1}{2}$ to $1\frac{1}{2}$	21,005
$-5\frac{1}{2}$,, $-4\frac{1}{2}$	37	$1\frac{1}{2}$,, $2\frac{1}{2}$	11,259
$-4\frac{1}{2}$,, $-3\frac{1}{2}$	355	$2\frac{1}{2}$,, $3\frac{1}{2}$	3,733
$-3\frac{1}{2}$,, $-2\frac{1}{2}$	2,098	$3\frac{1}{2}$,, $4\frac{1}{2}$	765
$-2\frac{1}{2}$,, $-1\frac{1}{2}$	7,670	$4\frac{1}{2}$,, $5\frac{1}{2}$	97
$-1\frac{1}{2}$,, $-\frac{1}{2}$	17,338	$5\frac{1}{2}$,, $6\frac{1}{2}$	8
$-\frac{1}{2}$,, $\frac{1}{2}$	24,255	Total	88,622

	S_1.	S_2.	S_3.	S_4.	S_5.
Rough value	17,726	188,168	111,560	1,196,948	1,169,816
Corrected value	17,726	180,783	107,128½	1,105,449	1,079,434
Most probable value[41]	17,726	180,783	107,123	1,105,566	1,079,234

	μ_2.	μ_3.	μ_4.	$1 + \mu_3^2/2\mu_2^3 - \mu_4/3\mu_2^2$.
Rough value	2·08325	·00074	13·00394	·00122
Corrected value	1·99992	·00074	11·99148	·00063
Most probable value	1·99992	·00068	11·99285	·00052

(iii.) *Chest Measurements of* 5,732 *Scotch soldiers* (see above).
By differences of 1 inch from $32\frac{1}{2}$ inches to $48\frac{1}{2}$ inches.
(iii *a*.) The same by differences of 2 inches from $31\frac{1}{2}$ inches to $49\frac{1}{2}$ inches.
(iii *b*.) ,, ,, 2 ,, $32\frac{1}{2}$,, $48\frac{1}{2}$,,
(iii *c*.) ,, ,, 3 ,, $31\frac{1}{2}$,, $49\frac{1}{2}$,,

Standard Deviation.

	Rough.	Corrected.	
From (iii)	2·073 inches	2·053 inches	Arithmetic mean = 2·053 inches
,, (iii *a*)	2·144 ,,	2·065 ,,	
,, (iii *b*)	2·121 ,,	2·041 ,,	
,, (iii *c*)	2·229 ,,	2·053 ,,	

Probable error = ·013 inch.

(iv.) *Proportions of* 999 *Naples Crabs* (*Professor W. R. Weldon*).[42]

Abscissa.	Number.	Abscissa.	Number.
$\frac{1}{2}$ to $1\frac{1}{2}$	1	$11\frac{1}{2}$ to $12\frac{1}{2}$	82
$1\frac{1}{2}$,, $2\frac{1}{2}$	3	$12\frac{1}{2}$,, $13\frac{1}{2}$	72
$2\frac{1}{2}$,, $3\frac{1}{2}$	5	$13\frac{1}{2}$,, $14\frac{1}{2}$	41
$3\frac{1}{2}$,, $4\frac{1}{2}$	11	$14\frac{1}{2}$,, $15\frac{1}{2}$	28
$4\frac{1}{2}$,, $5\frac{1}{2}$	40	$15\frac{1}{2}$,, $16\frac{1}{2}$	8
$5\frac{1}{2}$,, $6\frac{1}{2}$	55	$16\frac{1}{2}$,, $17\frac{1}{2}$	7
$6\frac{1}{2}$,, $7\frac{1}{2}$	98	$17\frac{1}{2}$,, $18\frac{1}{2}$	—
$7\frac{1}{2}$,, $8\frac{1}{2}$	121	$18\frac{1}{2}$,, $19\frac{1}{2}$	—
$8\frac{1}{2}$,, $9\frac{1}{2}$	152	$19\frac{1}{2}$,, $20\frac{1}{2}$	2
$9\frac{1}{2}$,, $10\frac{1}{2}$	147		
$10\frac{1}{2}$,, $11\frac{1}{2}$	126	Total	999

[41] The calculation of the most probable values is very laborious, and it is possible that there may be a slight inaccuracy in one of the results; but the calculations are believed to be correct. The method of making them need not be explained here, as the values are only required for the purpose of illustration.

[42] See Karl Pearson in *Philosophical Transactions*, vol. clxxxv (1894), A, p. 96.

(iv *a*.) The same by differences of 2 from $-\frac{1}{2}$ to $21\frac{1}{2}$.
(iv *b*.) ,, 2 ,, $+\frac{1}{2}$,, $20\frac{1}{2}$.
(iv *c*.) ,, 3 ,, $+\frac{1}{2}$,, $21\frac{1}{2}$.

Standard Deviation.

	Rough.	Corrected.	
From (iv)	2·740	2·725	
,, (iv *a*)	2·783	2·722	} Arithmetic mean
,, (iv *b*)	2·788	2·728	} = 2·725
,, (iv *c*)	2·859	2·725	

Probable error = ·041.

(v.) *Ages of* 8,689 *Enteric Fever Patients.*[43]

Age.	Number.	Age.	Number.
0— 5	266	45—50	98
5—10	1,143	50—55	40
10—15	2,019	55—60	14
15—20	1,955	60—65	8
20—25	1,319	65—70	4
25—30	857	70—75	1
30—35	503	Total	8,689
35—40	299		
40—45	163		

(v *a*.) The same by differences of 10 years from 0 to 80.
(v *b*.) ,, 10 ,, − 5 ,, 75.
(v *c*.) ,, 15 ,, − 5 ,, 85.

Standard Deviation. Unit = 5 *Years.*

	Rough.	Corrected.	
From (v)	1·976	1·955	
,, (v *a*)	2·034	1·950	} Arithmetic mean
,, (v *b*)	2·043	1·959	} = 1·955
,, (v *c*)	2·140	1·957	

Probable error = ·013.

It will be seen that in examples (iii) and (v) the *mistake* which would be caused by omitting $-\frac{1}{12}h^2$ from μ_2 is a good deal greater than the probable *error* of random selection; and therefore the correction is of importance when we are considering whether the data can be regarded as indicating random selection from some unknown community for which the values under consideration are distributed according to a particular law.

[43] Karl Pearson, *Philosophical Transactions*, vol. clxxxvi (1895), A, p. 390.

III.—*The Report of the Royal Commission on Agriculture.*

The final Report of the Royal Commission on Agriculture is divided into five parts: part I deals with the distribution and effects of agricultural depression; part II with the causes of depression; part III with miscellaneous subjects bearing on the agricultural position; part IV is a summary of recommendations, and part V is a supplementary report on the relation of the monetary changes of 1873-74 to agricultural depression. Parts I to IV are signed by 14 of the members of the Commission, and 10 of the 14 have signed part V. Mr. Channing and Mr. Lambert present separate Reports.

The Commissioners begin their Report with a brief reference to the findings of the Richmond Commission of 1879-82, which attributed the agricultural distress prevailing at that period primarily to bad seasons, and secondly to foreign competition. The existing depression of agriculture appears, however, to be due to economic rather than to climatic influences, for all the Commissioners agree that the main cause is to be found in the long continued fall in prices of farm produce: a fall which, in the opinion of the majority of the witnesses examined, may be ascribed to the growth of foreign competition. It will be convenient to take the chapters out of the order in which they are arranged in the Report, and to refer shortly at this stage to those paragraphs of part II, which deal with the changes in prices and imports during the past two decades.

The variations in the prices of the principal farm products are exhibited in a series of tables extending over a period of twenty years prior to 1895. In most cases the average annual prices have been calculated for consecutive triennial periods, these having been adopted in preference to the figures for single years with a view to diminish, as far as possible, any inequalities of season or otherwise which may have affected the prices of a particular year. The tables constructed in this way show a fall of 52 per cent. in the price of wheat; 37 per cent. in barley; 34 per cent. in oats; 20 to 40 per cent. in meat, according to quality; and 50 per cent. in wool. A better measure of the real extent of the fall is afforded by a calculation of the value of the average annual production of the three principal cereal crops in 1892-94 in Great Britain at the prices of 1876-78 and 1893-95 respectively: the results show a decline in value of 21,600,000*l.*, or more than 40 per cent. No calculation of a similar character is furnished for meat, as the estimates of the produce of this article are of a more speculative character than those of grain, and, moreover, the only records of prices available are those of the Metropolitan Cattle Market. It may be observed, however, that an estimate made from these data of the difference in the value of the average annual home production of beef and mutton of 1893-95 at the medium prices of 1876-78 and 1893-95 respectively would show a fall of 22,480,000*l.*, or nearly 25 per cent. As regards dairy produce the Commissioners put the fall in price in the twenty years at something under 30 per cent., but the material upon which this estimate is

based is admittedly far from satisfactory, and, judging from the records of prices of imported butter and cheese, 20 per cent. would be perhaps nearer the truth.

The fall in prices was attributed by the great majority of the witnesses examined by the Commission to the growing intensity of foreign competition, and thirty-four pages of the Report are devoted to an exhaustive statistical review of the development of the imports of agricultural produce. It is shown that wheat has been more affected than any other farm product by this competition, the foreign supplies having steadily displaced the home-grown product, until the latter now represents barely 25 per cent. of the total quantity available for consumption annually. In the case of meat the Commissioners state that they have been unable to trace any actual displacement of the home produce by the growth of the imports, the supply of foreign beef and mutton apparently meeting a demand for cheap meat which has not hitherto been satisfied by producers in this country. Some exception has been taken to this statement, but the figures given in the Report show clearly that, notwithstanding the increasing importation of meat, there has been an augmentation in our production of beef and pork, while that of mutton has not diminished. Consequently, the foreign article has evidently not displaced British produce, and when it is considered that the former is much cheaper than the latter, the inference may be drawn that the supply from abroad has really widened the area of consumption, by bringing meat within the reach of a larger number of the poorer classes of the community. In this connection it is interesting to note that Sir Robert Giffen suggests that the increase in the supply and consumption of meat is partly responsible for the fall in price of wheat, inasmuch as it has either diminished the demand for wheat among the people consuming that cereal, or has checked the increase of that demand which might have been expected to follow a great decline in price.

With respect to the extent of foreign competition in dairy produce, it is estimated that the importation of butter, margarine, and cheese represents more than 50 per cent. of the total quantities of these articles available annually for consumption in the United Kingdom.

After discussing the natural and economic conditions prevailing in the several competing countries and in Great Britain, the Commissioners reluctantly come to the conclusion that there is no near prospect of any permanent abatement in the pressure of foreign competition.

As the fall in prices has been more marked in grain, it is not surprising to find that agricultural depression has been most severely felt in districts where arable farming predominates. Its effects are strikingly illustrated by the fact that over 2,000,000 acres of land were withdrawn from the plough between 1875 and 1895, the diminution of the wheat acreage alone accounting for more than 1,900,000 acres of this loss. On the other hand, in the same interval there was an increase of more than 3,300,000 acres in the area devoted to pasture: an extension which is

explained by the statement that stock rearing and dairying have been less affected by the depression. Landowners have suffered from the decline in the rental and selling value of their land, while tenant farmers have experienced heavy losses owing to the depreciation in the value of farm stock and diminution of profits, the intensity of the distress in each case being more severe in arable counties than elsewhere. In illustration of the decline in the capital value of land a comparison is instituted between an estimate by Sir Robert Giffen, made in 1875, on the basis of thirty years' purchase of the annual value of "Land" under Schedule A of the Income Tax, and an estimate by Sir Alfred Milner based upon the same schedule for 1894 at eighteen years' purchase. The difference shows a fall of 834,000,000*l.* in the capital value of land in Great Britain. In the arable counties of England and Scotland rents are stated to have fallen about 50 per cent., but in other parts of the country the reduction has ranged from 10 to 30 per cent., and in Wales there have been apparently few permanent reductions. Similarly, occupiers of land have been more severely hit by the depression in the corn growing districts than elsewhere; in grazing districts the position of farmers has been less embarrassing, and dairy farmers and market gardeners near large centres of consumption have experienced little if any difficulty in conducting their business without loss. One factor in the situation which has tended to aggravate the distress of the tenant farmer has been his inability to reduce his labour bill. Prices have fallen, but wages have been maintained at their old level, if they have not actually risen. The effects of the depression on the agricultural labourers have been chiefly seen in a reduction of the number of the employed and in greater irregularity of employment, but the material condition of the labourer has everywhere improved. His earnings have not fallen, his food is cheaper; but that there has been a contraction of employment is proved by the census returns, which show a reduction of 187,356 in the number of male wage-earners in agriculture between 1871 and 1891.

After discussing the causes and effects of the depression, the Commissioners devote several chapters to an examination of such subjects as land tenure, mortgages, tithe rent charge, dairying, small holdings, railway rates, game laws, commercial gambling, sale of adulterated products, sale of cattle by live-weight, the Board of Agriculture, and agricultural education, all of which are described as miscellaneous subjects bearing on the agricultural position. They were unable to discern any practical connection between speculative dealing in "wheat futures" and agricultural depression. As regards the other subjects mentioned, they suggest various alterations of a minor character in existing legislation, but they do not claim for their recommendations that they will prove to be a complete remedy for agricultural depression. So far as the maintenance of foreign competition involves the continued depreciation of agricultural values, they look forward to a further reduction of the area of fertile land susceptible of profitable arable cultivation, together with a corresponding contraction of production and a diminution of the rural population.

The ten members of the Commission whose signatures are appended to the supplementary report attribute the fall in prices mainly to the monetary changes which took place in 1873-74, when the mints were closed to silver. They "do not suggest that the gold standard should be abandoned in this country," but they think that, if a conference of the Powers was assembled, and their deliberations resulted in an international agreement for the re-opening of the mints abroad and in India, and the restoration of silver, either wholly or partially, to the position which it filled prior to 1873, it would be of the greatest benefit to the industry of agriculture, and they hold that Her Majesty's Government should heartily co-operate with foreign Powers to promote such a conference. In a memorandum upon this subject, Sir Robert Giffen states that he considers it a great misfortune that some monometallists refuse to recognise the general fall in prices in the last quarter of a century, as being, in economic language, an appreciation of gold, and as being explained by a contraction of gold which commenced about the year 1873. All this can be said, he maintains, without implying any objection to the proposition so largely supported in the main report, that foreign competition is *the* cause of the present agricultural depression, and that the progress of invention, cheapening of means of communication, and the like influences are to be regarded as permanent causes of lower and lower prices. Foreign competition, in his view, will make itself felt whether the general level of prices and wages goes up or down: the question is one of the real relations between foreign cost of production and home cost of production, and if foreign articles of agricultural produce are produced at a less relative real cost in labour and profit than British articles, then foreign competition will tell, whatever the scale of money wages and prices may be.

The remainder of the volume before us is occupied by the separate reports of Mr. Lambert and Mr. Channing, neither of which requires notice here. An appendix to the Report contains some interesting statements as to the condition of agriculture in foreign countries and the colonies. There is also a useful analysis by Mr. Little of the farm accounts submitted to the Commission, and a further memorandum by Sir Robert Giffen on the real agricultural development of the last twenty years, in which he shows that meat is gradually displacing wheat, though this displacement must eventually be arrested.

IV.—*Agricultural Returns of Great Britain*, 1897.

The following preliminary statement of the extent of the various crops and the number of live stock in Great Britain for the current year has been issued by the Board of Agriculture. The tables are compiled from the returns collected on the 4th June, and comparisons with previous years are also included:—

Crops and Live Stock.	1897.	1896.	1895.	1894.
	Acres.	Acres.	Acres.	Acres.
Wheat	1,889,161	1,693,957	1,417,483	1,927,962
Barley	2,035,790	2,104,764	2,166,279	2,095,771
Oats	3,036,056	3,095,488	3,296,063	3,253,401
Potatoes	504,914	563,741	541,217	504,454
Hay from clover & rotation grasses	2,286,261	2,171,966	2,303,431	2,121,904
,, permanent pasture	4,509,977	4,637,923	4,760,074	4,851,759
Hops	50,863	54,217	58,940	59,535
	No.	No.	No.	No.
Cows and heifers in milk or in calf	2,532,379	2,511,675	2,485,820	2,460,086
Other cattle—2 years and above	1,323,230	1,365,057	1,431,525	1,516,672
,, 1 year and under 2	1,360,741	1,306,313	1,190,368	1,217,145
,, Under 1 year	1,284,147	1,310,537	1,246,623	1,153,210
TOTAL OF CATTLE	6,500,497	6,493,582	6,354,336	6,347,113
Ewes kept for breeding	10,006,697	9,925,587	9,663,129	9,668,002
Other sheep—1 year and above	6,219,001	6,427,982	6,334,386	6,342,730
,, Under 1 year	10,114,742	10,351,760	9,794,680	9,850,768
TOTAL OF SHEEP	26,340,440	26,705,329	25,792,195	25,861,500
Sows kept for breeding	334,244	393,729	415,210	351,119
Other pigs	2,008,058	2,485,072	2,469,221	2,038,907
TOTAL OF PIGS	2,342,302	2,878,801	2,884,431	2,390,026

Comparisons with 1896 *and* 1895.

Crops and Live Stock.	Increase.				Decrease.			
	Over 1896.		Over 1895.		Under 1896.		Under 1895.	
	Acres.	Per cnt.	Acres.	Per cnt.	Acres.	Per cnt.	Acres.	Per cnt.
Wheat	195,204	11·5	471,678	33·3	—	—	—	—
Barley	—	—	—	—	68,974	3·3	130,489	6·0
Oats	—	—	—	—	59,432	1·9	260,007	7·9
Potatoes	—	—	—	—	58,827	10·4	36,303	6·7
Hay from clover	114,295	5·3	—	—	—	—	17,170	0·7
,, pasture	—	—	—	—	127,946	2·8	250,097	5·3
Hops	—	—	—	—	3,354	6·2	8,077	13·7
	Number.	Per cnt.	Number.	Per cnt.	Number.	Per cnt.	Number.	Per cnt.
Cows	20,704	0·8	46,559	1·9	—	—	—	—
Other cattle—								
2 and above	—	—	—	—	41,827	3·1	108,295	7·6
1 and under 2	54,428	4·2	170,373	14·3	—	—	—	—
Under 1	—	—	37,524	3·0	26,390	2·0	—	—
TOTAL CATTLE	6,915	0·1	146,161	2·3	—	—	—	—
Ewes	81,110	0·8	343,568	3·6	—	—	—	—
Other sheep, 1 and above	—	—	—	—	208,981	3·3	115,385	1·8
,, under 1	—	—	320,062	3·3	237,018	2·3	—	—
TOTAL SHEEP	—	—	548,245	2·1	364,889	1·4	—	—
Sows	—	—	—	—	59,485	15·1	80,966	19·5
Other pigs	—	—	—	—	477,014	19·2	461,163	18·7
TOTAL PIGS	—	—	—	—	536,499	18·6	542,129	18·8

V.—*Notes on Economical and Statistical Works.*

Our Trade in the World in relation to Foreign Competition, 1885-95. By William S. H. Gastrell. 8vo., 204 pp. 6*s*. London: Chapman and Hall, 1897.

A volume dealing with British trade and the competition of other countries, particularly of Germany, which is prepared by the Commercial Attaché to Her Majesty's Embassy at Berlin, naturally commands attention as being, in a sense, an authoritative statement of the facts of the case. In it many will seek to find the facts which may prove or disprove the statements of persons presumably less well informed than so important an official. It is not too much to say that the tone of the book is far less alarmist than that of certain other popular expositions of the same material. It does appear, however, as if, in not a few places, a willingness to see Britain triumphant would have modified the emphasis laid on this or that figure, as if, in fact, the writer were so thoroughly imbued with the belief in German success and British failure, as to find evidence of it where a prejudice in the contrary direction would have failed to find any proof at all. In saying this we would not imply that there has been any conscious bias in choice of facts or in their arrangement. It is probably impossible to write without unconscious bias on such a burning subject.

We will briefly note one point in reference to a subject dealt with in another volume which we notice this quarter. Laments over decreased exports of British coal may be expected from some quarters, but there is another aspect of this particular trade, and it would not be entirely unreasonable to feel even a little pleasure if we were less active in exploiting our limited, if large, coal resources for the benefit of our rivals in industry.

An enormous number of figures are given by Mr. Gastrell, but we would gladly have seen a different principle of arrangement. The strength of his argument as to the relative advance of our rivals might even be increased if he were to avoid the often fallacious comparison of particular years which he everywhere employs. It may be that the figures of 1885, 1890, and 1895 give a fair epitome of the course of trade in the decade dealt with. The special influences which, in individual years, affect different countries in very varying degrees would, however, have been more assuredly discounted if a comparison of average figures for (say) three or five years ending 1885 had been compared with similarly prepared figures for the other dates. Reports of Sir Robert Giffen, to which Mr. Gastrell must, we imagine, have referred in preparing his tables, might have suggested the advantage of such a course. One disadvantage of the single-year comparisons is seen in some cases where figures for 1886 are used in respect to German trade, while those for 1885 are retained for British trade, giving thus a halting comparison. Whether the contrasts obtained be thus made more or less favourable to our country is not the point with which we are here concerned. It is whether the course

adopted is that one among those open to us which is likely to give the truest conspectus of the actual advance or regression.

The figures collected have obviously involved the expenditure of much time and labour, and from them a great deal can be learned, and the volume contains much food for careful thought. We do not wish to appear ungracious, knowing how great is the liability to error or misprint in such masses of figures, yet we cannot pass by one serious blunder without remark, because it is not merely a misprint. By dropping the first figure, the total trade of the mother country with British North America in 1895 is shown as 9,994 thousands of pounds instead of 19,994. No suspicion seems to have entered the mind, even, of an official who might be expected to detect such a blunder, at the apparent extinction of more than one half of the trade of Canada with Britain. He comments with deliberation on the amount of this loss, although on the next page he records the separate figures of the import and export sections of this trade correctly. Had the error occurred merely in the table of figures, it would have been simply explicable. The restatement of the amount appears to suggest a slight lack of critical faculty or an unsuspicious disposition such as would not be expected of a statistician. Rightly or wrongly we felt a desire not to accept without verification certain other figures presented, though we must do the author the justice of saying that we detected no similar error elsewhere.

Besides the tables of figures in the text, which are generally summaries, some thirty pages of the appendices are occupied with more detailed tables of figures illustrating the subject of the book.

The Chances of Death, and other Studies in Evolution. By Karl Pearson, M.A., F.R.S. 2 vols., 8vo. 862 pp. 25*s.* London: Edward Arnold, 1897.

Twelve essays are collected in these two volumes, of which four have already been presented to the public in the *Fortnightly Review*. The first volume contains those essays which will appeal most forcibly to the statistician as such, the essays of the second volume being concerned rather with folk-lore and anthropology. Of the essays in vol. i, again, four are particularly concerned with the treatment of statistical material, the others dealing with evolution from other aspects.

Professor Pearson's contributions to statistical science are well known to members of our Society, and in the papers here collected will be found an exposition of his methods particularly welcome to those who desire to understand them, but are unable to follow the complicated mathematics of the memoirs of the Royal Society in which they have been presented.

In the first essay the author lays stress on the difference between the old conception of chance and the new, the contrast of the law and order observable in the grouping of large numbers of events, and the chaos which was the fixed idea associated with chance in former times, and which is still associated with that word in the minds of the majority of those who use it.

The analysis of the mortality returns which this essay contains

is extremely interesting, there being shown five independent series of deaths, which the author refers to old age, maturity, youth, childhood, and infancy, respectively. It is worthy of note that no less than 484 persons of every 1,000 born fall into the group of those dying of old age. The French statistics give results but little different from those afforded by the English returns. A peculiarity of the method employed is the suggestion of a large number of ante-natal deaths. During the last six months of pregnancy there appear to occur about 1 death to every 5 living births, and yet larger numbers at earlier stages. The comparison of this suggestion of theory with actual fact is not easy, but we may perhaps hope for a partial verification or correction in course of time.

We will content ourselves with noting in passing that, from the records of Monte Carlo roulette, Professor Pearson reaches the conclusion that the game as played in 1892 was not a game of pure chance.

In dealing with the subject of "Reproductive Selection" and "Variation in Man and Woman," our author finds it necessary to insist on a proper conception of variation and its true measurement; on the importance for evolution of the small normal variations rather than of extraordinary, what he calls *pathological*, variation. The measure of the variation itself must be taken as something other than the range about the mean of observed variation. The many cases of small deviation from the type are to be allowed proper weight as against the occasional occurrence of instances of extreme deviation. For the mode of constructing a proper measure of variation, we refer to our author's writings those who may desire to criticise or understand his methods.

It is important to notice that the available statistics of the fertility of marriage show that one half of the children of the race are being brought into the world by one quarter of the parents. The preponderance in each generation of the children who belonged to the large families of the preceding generation must be regarded as startling, and merits the most careful attention. We are led to inquire into the probable outcome of such a state of things, especially as the figures quoted refer, not to births, but to children surviving after fifteen years of married life; some inquiries, with similar results, dealing with surviving children after twenty-five years of matrimony. When to the result reached—namely, that the lower death-rate of the professional classes does no more than compensate for its lower birth-rate—we add the consideration that the frequency of marriage is, in proportion to numbers, greater in the artisan than in the professional class, it seems clear that the working classes have the future of the world in their hands in a wider sense than is ordinarily admitted. We would gladly see a wider range of statistics collected to further test this most important question.

A few words must suffice to indicate the subject matter of the essay on "Variation in Man and Woman." It is devoted to meeting the general belief that man is a more highly variable animal than woman, with facts tending to throw serious doubt on

its soundness. The facts collected would certainly justify the professor's contention that it is not proven that the current view is adequately supported by observation. It is worth noting that in some cases the author admits that recorded wider variation in woman, where it is not a distinctly sexual characteristic that is the subject of measurement, is likely to be the result of less strenuous struggle in the battle of life than that which man has to endure. It has occurred to us to ask the question as we read, whether this reason might not apply to discount the records sufficiently to give some support to the current view.

Our Coal Resources at the close of the Nineteenth Century. By Edward Hull. 8vo., 157 pp. 6*s*. London: E. and F. N. Spon, 1897.

Notwithstanding Lord Kelvin's assurance at the recent meeting of the British Association at Toronto, that mankind is likely to exhaust the oxygen of the air before reaching the end of the world's coal supply, a good deal of interest attaches to the question of the position of our own country in regard to the supply of fuel available for its own industries and for sale to other countries. Our native coal fields may possibly approach exhaustion while other countries still enjoy abundant supplies, and if that should occur the position of our country would, in the opinion of many people, be seriously menaced. The new estimate of so competent an authority as Mr. Hull of the amount of coal remaining within the limits of possible profitable mining, must therefore be received with considerable interest. Reviewing each coal field in turn, in a brief space the author gives estimates of available quantities, with reasons for differing from previous estimates by others. For fuller information on many points reference must be made to the author's larger and more detailed work. In estimating for a total annual production of 200 million tons at the end of the century, the author must be considered as adopting an extremely moderate view. At that rate of consumption the supplies estimated to exist would last for 400 years approximately. Three-fifths of the whole, roughly, is assigned to the visible coalfields, including partially concealed areas; the remaining two-fifths exist in entirely concealed areas. Of the latter the estimate must necessarily fall short even of the rough precision attaching to the former.

Our native supplies of coal, according to this last authoritative estimate, will endure, and in plenty, during the lifetime of the present, and indeed of several succeeding generations. Taking the average output of 1872 to 1881 and comparing it with that of 1887 to 1896, we find an increase has been recorded at the rate of 3 millions of tons per annum. An average of one-half of this annual increase during the twentieth century would give an average output for that century of about 275 millions of tons, and one-third of the coal remaining within practical working limits in these islands would be used up in the century. The approach of the time when the difficulties attending extraction of coal from the mine will be very greatly increased is not, therefore, a thing of the indefinite future. The chapter of the book which deals with the approximate

limit of deep mining is of great interest in this connection. The author's exhortation to economy both in production and in consumption of coal is a fitting conclusion to the account he has given of this part of our mineral wealth.

A few figures relating to the available supplies of foreign coalfields and the extent to which this country supplies certain foreign countries with fuel add an interest to the volume.

It may be noted in passing that calculations are made to the end of 1899, as if that date were the end of the nineteenth century. It is hardly necessary to add that the error thus introduced into the estimate of the total of coal remaining at the end of the century is not of importance.

The Foreigner in the Farmyard. By E. E. Williams, F.S.S. 173 pp., 8vo. Heinemann, 1897. 2*s.* 6*d.*

From the author of *Made in Germany* (reviewed in these columns, December, 1896) we know what to expect when he presents us with a new book on a similar subject. We expect and we receive a certain amount of economic heresy and a very large amount of useful information. Mr. Williams shows how the United States, Russia, and Argentina are deluging the English market with wheat (p. 13), yet "English wheat land is 50 per cent. an acre more fruitful than the average foreign land which beats it in the market. Nature backs the English farmer; what hampers him is the supineness of his government" (p. 19). Mr. Williams knows very well however that this "fruitfulness" increases as the acreage diminishes, all but the very best wheat land going out of cultivation. If (see p. 19) we put 4 millions of acres under wheat (to say nothing of 8 millions), the wheat land per acre would hardly be 50 per cent. an acre superior to the foreign. In any case to recover the lost ground for wheat would mean to create an artificial scarcity, and our people will need very potent political arguments indeed to convince them that they must so deny themselves for the sake of one particular branch of agriculture. At present, protection *laudatur et alget.* The admixture of protectionism in this book may make the wholesome truths of it palatable to the English farmer, and may therefore be easily pardoned. Though the shopkeeper is most blamed for the chaotic state of the meat market (chapter ii), it is the British farmer who is found to be most at fault when Denmark beats him in dairy produce (chapter iii). He is a hopeless individualist, and will not join with his neighbours, as the Dane does, to form co-operative dairies (p. 52). Danish butter is not only cheaper but better than his. Sweden, Brittany, Normandy, even distant Victoria, are also formidable competitors. The British farmer is apathetic, and too often will not be helped even to help himself (p. 62, *seq.*). Ireland is ahead of England, in this matter at least. Instead of believing with the Farmers' Club that farmers cannot co-operate because of their poverty, Irish dairy farmers have begun to learn that it is precisely the poor that get most by co-operation (pp. 63—69). After this we can read with patience that the dairy industry, being an infant industry, needs protection (pp. 74 and 75).

The account (in chapter iv) of "the orchard and the poultry run" is fairly hopeful. The growing of fruit still pays (p. 92, *seq.*), and even now English eggs keep their market (p. 112).

There is an interesting and possibly too sanguine chapter on the "possibilities of beetroot" (chapter v). Mr. Williams considers that the experiment of Mr. Duncan in Lavenham twenty years ago was not decisive (p. 115).

Finally, the chapters on "transport" (vi), "agricultural banks" (vii), and "burdens on the land," recapitulate much useful evidence and inquiry recently brought before the public. The protectionism of the book, even when it peers out, for example, in the praise of hop cultivation as "employing more labour than any other kind of farming" (p. 106, compare p. 110), need not blind us to its merits; and we may expect readers to reflect for themselves on the curious problem how a nation proved in *Made in Germany* to be failing in manufacture, can find the means to pay for the vast and increasing imports of food, which are the burden of *The Foreigner in the Farmyard.*

Tables de Mortalité pour le Royaume des Pays-Bas. Construites par M. le Dr. A. J. Van Pesch. 4to. xlv + 40 pp. s'Gravenhage, 1897.

We have here an extract from the official statistics of the Netherlands, with an introduction in which Professor Van Pesch explains the particular methods by which he has prepared these tables, these methods being the same as those adopted for a similar set of tables ten years ago. We have now tables for the decade 1880-89, and it may be of interest to make a brief comparison or two with the life table for England and Wales based on the figures of 1881-90, which is given in the last decennial supplement issued by our Registrar-General. We find that, of a given number born, and subject to such conditions as prevailed in the decade concerned (the Dutch and English periods are sufficiently nearly coincident for comparison not to be vitiated), except in the second year of life, deaths are fewer in England than in Holland up to and including the 25th year for both sexes. Then they become more numerous till the 70th year is reached for men, the 73rd for women, after which the Dutch deaths are again in excess. The saving of life in the early stages of life is so marked in England that it is not till age 54 is reached for men, 62 for women, that the heavier death-rate during maturity which distinguishes England suffices to reduce the numbers surviving to the Dutch level.

Comparing the two sexes, the deaths (not death-rate, but deaths of a given number born) are in excess for females in England at ages 2—4, 13—29, and over 66. In Holland, at ages 1 and 2, 4 and 5, 7—17, and 25—42, as well as over 66, the female deaths are in excess, the separation of the excess of deaths during puberty from those a few years later recalling English life-tables of forty years back.

The compiler of the tables lays special stress on the mode adopted in the compilation. He refers the deaths, not to the ages

of the deceased, but to their year of birth. When more complete observations are available, it seems probable that it will be found that the conditions of the birth-year affect mortality throughout the time of life of those born in that year. Having census returns on a like basis, a control over the returns of subsequent censuses is obtained, and possibly greater accuracy, so far as a diminished tendency to concentration round the tenth years of the calendar and of age is concerned, may also be attained.

Having obtained the death-rate for each of the ten years of the decade, the mean of the 10 rates, instead of the mean rate of the decade, is used. The amount of this correction turns out to be quite small. The rates for the two sexes, up to age 90, give us 182 rates for comparison; of these 150 do not differ by more than $\frac{1}{4}$ of 1 per cent. of their value from those obtained in the ordinary way, *i.e.*, the variation of the mean of the 10 death-rates for each age during the decade from the mean rate for that age for the decade is comprised within limits which, considering the magnitude of the figures dealt with, and the fact that they are only calculated to two places of decimals, would hardly justify such additional labour in preparing the tables on the ground of the greater accuracy secured, if no further purpose were in view. Forty-five of the 182 rates are the same on the two methods of calculation.

The compiler of the tables has adopted methods of getting rid of irregularities in the returns which hardly need extended description. The curves showing the death-rate as varying with age for each of the two sexes are appended to the returns, and are extremely well prepared and engraved.

L'Économie Sociale de la France sous Henri IV, 1589-1610. Par Gustave Fagniez. 8vo., 428 pp. Paris: Hachette et Cie., 1897.

The author of this work sets before himself, as his object, to trace the economic development of his country during a peculiarly interesting period, to supply what was wanting, a special treatment of this side of national life during a reign which, as he says, was "partagé presque également entre une anarchie dissolvante et une féconde activité." Of the first phase he gives many illustrations, summing up some of its characteristics thus: "Hausse des prix, suivie seulement de loin par celle des salaires, stagnation de la production, diminution de la population en général, déclassement de la population laborieuse, développement de l'agiotage et du luxe, rien ne manquait à la société française vers 1598." One cause of the misery he describes is indicated in another sentence, thus: "Tous les services de la vie sociale, depuis les plus élevés jusqu'aux plus modestes, depuis les fonctions de premier président du parlement jusqu'à la profession de mouleur de bois et de vendeur de foin, avaient été érigés en offices."

The story of the efforts made by Henri and his minister Sully to remedy the evils which the civil wars and other causes had wrought is told at some length. What was done for agriculture, for industry, and for commerce, both internal and external, fell

short of what was attempted, as is shown particularly in the history of the efforts to revive and extend the production of silk and the manufacture of silk goods. From the point of view of the average reader, a great merit of the book will be found in its avoidance of numerical statistics, a feature which tends to be prominent in works on economic history.

While estimating very highly indeed the purposes and deeds of Henri, the author is by no means blind to his mistakes. The account he gives, however, leaves a very strong impression on the reader of the enormous value of the services rendered by this monarch to the economic development of the kingdom.

Statistik und Gesellschaftslehre. Von Dr. Georg von Mayr. Zweiter Band. *Bevölkerungsstatistik.* Large 8vo., 486 pp. Freiburg i, B., 1897.

The first volume of this work has been already noticed in this *Journal* (1895), and we need do little more here than call attention to the publication of the second volume. Dr. von Mayr discusses population statistics from many different points of view. He considers the objective purpose of any particular group of statistics, the most effective of the methods practically available for securing the records required, and the results to be obtained from examination of the records. In the comparisons instituted between different countries, the difficulties which result from the varying modes of collecting statistical material which different governments adopt are well illustrated. The material for practical examples dealing with the various points which are discussed is drawn from the records of all parts of the world, though Austria, Hungary, and Germany supply, as might be expected, a larger portion than other countries. The latest tables of Signor Bodio are constantly quoted in international comparisons. Each section of the work is followed by an admirable bibliography of the subject therein dealt with, and the wealth of material in the volume, as well as the care with which the index has been prepared, will be seen from the fact that this index occupies thirty-three pages, each of three columns. As a treatise on population statistics, as well as a mine of information, the volume is a most valuable addition to already existing works, and in preparing it, Dr. von Mayr has added one more to his already great services to statistical science.

Der Clearing- und Giro-Verkehr im Österreich-Ungarn und im Auslande. Von Dr. Heinrich Rauchberg. Large 8vo., 212 pp. Wien, 1897.

The particular part of the organisation of credit which is treated in this book has already formed the subject of a treatise by the same author, published in 1886, to which constant reference is made throughout this later and fuller discussion.

The operations of the clearing houses of Austria, Hungary, and Germany, are examined and analysed, a briefer exposition of other clearing houses in various parts of the world is given, and this is followed by a more particular examination of the nature of the business of the leading banks of the world, and especially of Austria.

Wherever possible the author endeavours to place on record the figures which show most clearly the extent to which the banks, and still more the clearing houses, serve as machinery for economising the use of metallic money and legal tender notes. He shows that, up to the present, the Austrian and Hungarian clearing houses are by no means highly efficient in this respect, and points out some of the reasons, and further, towards the end of the volume, makes certain propositions for improving the present condition of affairs. The account of the business of the postal savings banks of the two countries comprising the dual monarchy shows how much use is made of the facilities offered through these organisations, and suggests that a large need exists for further banking facilities.

The work deals with an extremely important aspect of the great business of exchange, and suggests not a few important problems.

We take the liberty of pointing out that the author incorrectly states that Australia has but one clearing house, that at Melbourne. The Sydney clearing, though somewhat smaller in amount than that at Melbourne, is not only a fact, but a very important fact.

Two diagrams show the variations during 1896 of two of the principal items in the accounts of the Austro-Hungarian bank and the German Reichsbank.

Statistical and Economical Articles in Recent Periodicals.

UNITED KINGDOM—

Economic Journal. 1897—

June—Agrarian Reform in Prussia. II: *Prof. L. Brentano.* The Debasement of the Coinage under Edward III: *A. Hughes, C. G. Crump, and C. Johnson.* Senses of "Capital": *I. Fisher.* The Incidence of Taxation upon Ireland: *B. Holland.* The Pure Theory of Taxation. II: *Prof. F. Y. Edgeworth.* The Railway Commission: *W. M. Acworth.* Import and Export Index-numbers: *A. L. Bowley.* What is Capital?: *E. Cannan.* Distress amongst Hand-weavers in Bombay: *Prof. W. Muller.*

September—The Theory of Railway Rates: *W. M. Acworth.* The Elberfeld and English Poor Law Systems: A comparison: *W. Chance.* Wholesale and retail prices: *R. Newman.* The Insurance of Industrial Risks: *M. Barlow.* The new German Exchange Act: *Prof. W. Lexis.* Imperial Finance and the Irish Financial Relations Question: *Prof. C. F. Bastable.* The new Canadian Tariff: *A. W. Flux.* Some Economic Aspects of the Cuban Insurrection: *C. A. Harris.* Political Economy in Italy: *Prof. A. Loria.*

Economic Review. July, 1897—Recent aspects of the Currency Question: *H. M. Conacher.* The Failure of Co-operation: *Joseph Ackland.* Citizenship and Personality: *N. E. E. Swann.* Modern Criticisms of the Poor Law: *Rev. L. R. Phelps.*

UNITED STATES—

American Statistical Association Publications. June, 1897—Francis Amasa Walker: *Hon. C. D. Wright.* Bibliography of the writings and reported addresses of Francis A. Walker.

Annals of the American Academy of Political and Social Science—

July—The Immigration Question: *J. H. Senner.* Overnutrition and its social consequences: *S. N. Patten.* Rousseau and the French Revolution: *C. H. Lincoln.* The George Junior Republic: *W. I. Hull.*

September—The shiftless and floating city population: *E. T. Devine.* The Problems of Political Science: *L. S. Rowe.* Administrative centralization and decentralization in England: *J. T. Young.* The philosophical basis of Economics: *S. Sherwood.* Current Transportation Topics: *E. R. Johnson.*

Journal of Political Economy. June, 1897—Monetary Reform in Russia: *H. P. Willis.* Fall in the price of Silver since 1873: *E. S. Meade.* Diversion of the flour and grain traffic from the Great Lakes to the Railroads: *G. G. Tunell.* The Gold Standard in Japan: *J. L. Laughlin.*

Quarterly Journal of Economics. July, 1897—The Tory origin of Free Trade Policy: *W. J. Ashley.* Certain tendencies in Political Economy: *B. Moses.* The German Exchange Act of 1896: *E. Loeb.* The Value of the money unit: *T. N. Carver.* The career of Francis Amasa Walker: *C. F. Dunbar.*

Yale Review. August, 1897—The Prevention and Relief of Famine in India: *P. C. Lyon.* The Economic Theories advanced to explain the steady increase of public expenditure in Europe: *G. Fiamingo.* The New Administration in Canada: *E. Porritt.* The "Sociétés de secours mutuels" of France: *W. F. Willoughby.*

FRANCE—

Annales de l'École Libre des Sciences Politiques. July, 1897—Le développement économique du Japon depuis la guerre contre la Chine: *J. Franconie.* De l'état présent et prochain de l'ouvrier américain *(to be continued)*: *E. Levasseur.* Kartells, Pools, Trusts: *Ch. Guernier.*

Journal des Économistes, 1897—

July—Le crédit agricole:—Rapport d'une commission des valeurs agricoles instituée en 1882. Les chambres de compensation et les caisses de liquidation *(concluded)*: *G. François.* La coopération dans l'agriculture danoise: *D. Bellet.* La crise médicale: *M. Rouxel.*

August—La guerre a coup de tarif: *G. de Molinari.* Le socialisme chrétien. A propos d'un livre récent: *G. du Puynode.* Le mouvement agricole: *L. de Tourville.* Vingt années de commerce: *M. G. Mulhall.*

Journal de la Société de Statistique de Paris, 1897—

July—Un dernier mot sur les bénéfices comparés du travail et du capital (correspondance): *A. Coste.* La population de Berlin en 1895: *P. Meuriot.* Résultats généraux et charges

FRANCE—*Contd.*

Journal de la Société de Paris, 1897—*Contd.*

July—Contd.

futures des assurances ouvrières allemandes (*concluded in next number*): *M. Bellom.*

August—L'évolution de l'assurance contre l'incendie: *M. Candiani.* Vingt-cinq ans de dépenses d'un ménage parisien (du 20 avril, 1872, au 19 avril, 1897): *A. Michaut.* Le problème monétaire (*continued in next number*): *F. de Flaix.*

September—Note sur l'industrie et le commerce de la France: *Y. Guyot.* Le recrutement dans ses rapports avec la population: *L. Vacher.* Chronique de statistique judiciaire: *Em. Yvernès.*

La Réforme Sociale, 1897. *Nos.*—

34—La vie ouvrière en Angleterre, d'après quelques publications récentes: *H. Clément.* L'organisation des partis aux États-Unis et en Belgique: *A. Nerincx.* L'arrêt dans la population française, ses causes dans le passé, ses effets dans l'avenir (*concluded*): *M. des Cilleuls.*

35—Compte rendu de la réunion annuelle.

36 *et* 37—De la liberté testamentaire chez les peuples étrangers (*continued in next numbers*): *R. de la Grasserie.* Pour l'enquête sur la marine marchande: *E. Rostand.* L'état du régime corporatif en Autriche: *V. Brants.* De la situation morale des enfants loués aux fermiers du Perche: *P. Drouin.* L'alcoolisme en Normandie, d'après une récente enquête: *L. Mabilleau.*

38 *et* 39—Natalité et recrutement militaire.—Avantages à faire aux familles nombreuses: *A. de Metz-Noblat.* La désorganisation de la famille et ses conséquences sociales: *E. Passez.* Les monographies de communes: *E. Cheysson.*

Revue d'Économie Politique, 1897—

June—Quelques expériences de conciliation par l'État en Australasie: *A. Bertram.* La répression du travail en chambre (*continued in next number*): *E. Schwiedland.* Une monographie d'impôt.—La taxe mobilière à Genève: *A. Achard.*

July—Théorie du libre échange: *L. Walras.* L'Étalon d'or au Japon: *M. Bourguin.* Les boucheries co-opératives en Angleterre: *F. Rockell.*

GERMANY—

Archiv für Soziale Gesetzgebung und Statistik, 1897—

Band 10, *Heft* 6.—Das deutsche Vereins- und Versammlungsrecht: *W. Kulemann.* Die Ausdehnung der Krankenversicherung auf die Hausindustrie: *P. Blankenstein.* Die heutige Gewerkschaftsbewegung in der Schweiz: *A. Steck.* Der Haftpflicht-Gesetzentwurf von 1897. (Workmen [Compensation for Accidents] Bill): *The Right Hon. Sir C. W. Dilke.* Die Gewerbeinspektion in Oesterreich im Jahre 1896: *Dr. E. Mischler.*

GERMANY—*Contd.*

Archiv für Soziale Gesetzgebung und Statistik, 1897—*Contd.*

Band 11, *Hefts* 1 und 2.—Die theoretische Basis der britischen Gewerkvereine: *S. und Beatrice Webb.* Die neue deutsche Handwerker-Gesetzgebung: *Dr. P. Voigt.* Das schweizerische Fabrikgesetz und sein Einfluss auf die industriellen Verhältnisse der Schweiz: *O. Lang.* Die weibliche Fabrikinspektion in den Vereinigten Staaten: *Florence Kelley.* Die Ursachen der Betriebsunfälle in der deutschen Industrie und Landwirtschaft: *Dr. E. Lange.* Die Verkürzung der Samstagnachmittag-Fabrikarbeit in der Schweiz: *Dr. F. Schuler.* Ein internationales Amt für Arbeiterschutz: *Dr. H. Braun.*

Jahrbuch für Gesetzgebung, Verwaltung, &c., Heft 3, 1897—Roschers politische Entwickelungstheorie: *O. Hintze.* Die Entwickelung der Königsmeister im französischen Zunftwesen vom Mittelalter bis ins 18 Jahrhundert: *R. Eberstadt.* Strafrechtsreform oder Sittenpolizei?: *A. Korn.* Die Gemeinden und die Arbeiterversicherung: *H. von Frankenberg.* Die Fabrik- und Sanitätsinspektorinnen in England: *Helene Simon.* Zur Geschichte der Grundeigentumsformen in Kleinrussland: *J. Lutschizky.* Neuere Litteratur zur Hamburgischen Handels- und Wirtschaftsgeschichte: *E. von Halle.* Eine neuere englische Stimme über das Lohn- und Gewerkvereinsproblem: *M. Biermer.* Die Hauptergebnisse der neuesten deutschen Handwerkerstatistik von 1895: *P. Voigt.* Die vom "Verein für Socialpolitik" veranstalteten Untersuchungen über die Lage des Handwerks in Deutschland mit besonderer Rücksicht auf seine Konkurrenzfähigkeit gegenüber der Grossindustrie. Zusammenfassende Darstellung von *H. Grandke.*

Jahrbücher für Nationalökonomie und Statistik, 1897—

June.—Der Ausstand der Hamburger Hafenarbeiter, 1896-97, 11: *R. Ehrenberg.* Die Lage der Landwirtschaft in Russland nach dem neuen Kollektivwerke russischer Nationalökonomen und Statistiker: *M. v. Soboleff.* Die grossen Berliner Effektenbanken im Jahre 1896: *E. Loeb.* Die Arbeitseinstellungen in Preussen in den beiden letzten Jahren: *M. Biermer.*

July.—Eine Untersuchung über den Gewerbebetrieb im Umherziehen: *R. Rössger.* Zur Entstehung der deutschen Stadtverfassung: *W. Varges.* Die Entwickelung der deutschen Hochseefischerei in der Nordsee: *L. O. Brandt.*

Vierteljahrshefte zur Statistik des Deutschen Reichs, 1897. *Heft* 3.—Gemeinden und Wohnplätze von mindestens 2,000 Einwohnern nach der Volkszählung, 1895. Die Haushaltungen nach der Volkszählung, 1895. Die Bevölkerungsvermehrung, 1890-95 und 1885-90. Zur Statistik der Preise. Ernte-Statistik des Deutschen Reichs für das Erntejahr 1896.

AUSTRIA—

Statistische Monatschrift, 1897—

April—May Heft—Statistik der in Nieder-Oesterreich verwalteten Stiftungen nach dem Stande vom 31 December, 1893:

AUSTRIA—*Contd.*

Statistische Monatschrift, 1897—*Contd.*

April—May Heft—Contd.

Dr. F. Schmid. Die Fortschritte der Raiffeisen-Cassen und die bisherigen Ergebnisse ihrer Gebarung in den im Reichsrathe vertretenen Königreichen und Ländern: *Dr. F. Schmid.*

June—July Heft—Die österreichischen und ungarischen Staatsangehörigen in Bosnien und der Hercegovina. Die Irrsinnigen Oesterreichs im Jahre 1894: *Bratassevic.* Die Sterblichkeit in den grösseren Städten Oesterreichs im Jahre 1896: *Bratassevic.* Oesterreichs Sparcassen im Jahre 1895: *H. Ehrenberger.* Zur Statistik der localen Versicherungsvereine gegen Feuerschäden in Oesterreich im Jahre 1894: *H. Ehrenberger.*

ITALY—

Giornale degli Economisti, 1897—

July—La teoria pura del monopolio: *J. Y. Edgeworth.* La crisi agrumaria e i "Provvedimenti di Legge": *A. De Viti de Marco.* La legge Inglese 7 Giugno, 1897, sulla assicurazione del lavoro: *A. Cabiati.*

August—Osservazioni sulla spinta contributiva delle tasse: *A. Puviani.* Di una applicazione delle dottrine agronomiche alla rendita fondiaria: *A. Cabiati.* I sindaci nelle società in accomandita per azioni e nelle anonime: *M. J. de Johannis.*

September—Finanza e dogane: *L. Fontana-Russo.* La Triplice Alleanza e la politica dell' Italia: *E. Giretti.* Corrispondenza col pubblico (Dazio sul grano): *A. De Viti de Marco.*

SWITZERLAND—

Journal de Statistique Suisse, 1897—

Lief 3—Statistische Beiträge zur Morbidität und Mortalität der Stadt Basel während der Jahre 1881-90: *Dr. P. Heusler.* Kulturstatistische Probleme: *C. Mühlemann.* Was ist Statistik? *Dr. N. Reichesberg.* Das schweizerische Telegraphenwesen im Jahre 1896, verglichen mit 1895.

Lief 4—Die öffentlichen Arbeitsnachweis-Bureaux der Schweiz: *Dr. K. Petermann.* Verzeichnis schweizerischer Erziehungsanstalten. De l'administration et de la comptabilité des communes en Suisse.

VI.—*Quarterly List of Additions to the Library.*

Additions to the Library during the Quarter ended 15th September, 1897, *arranged alphabetically under the following heads:*—(a) *Foreign Countries;* (b) *India and Colonial Possessions;* (c) *United Kingdom and its Divisions;* (d) *Authors, &c.*

Donations.	By whom Presented (when not purchased).
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JOURNAL

OF THE ROYAL STATISTICAL SOCIETY,

DECEMBER, 1897.

Notes *on the* Subjects Discussed *at the* St. Petersburg Meeting *of the* International Statistical Institute.

By Major P. G. Craigie, *Hon. Foreign Secretary.*

[Read before the Royal Statistical Society, 16th November, 1897.
The President, Rt. Hon. Leonard H. Courtney, M.P., in the Chair.]

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To this Society the biennial gatherings of the International Statistical Institute appeal with peculiar interest. The circumstances under which the Institute, the successor of the older congresses, came into being in connection with our own jubilee meeting of 1885 are fresh in all our memories, and this interest is quickened by the natural desire of statisticians to learn the class of subjects which a representative association of this character have found to be susceptible of international treatment, and what suggestions are offered for future modes of investigation.

It requires then no apology to bring under your notice some

account of the most recent discussions, and the impression they left on the mind of one who took part in them, but it is needful that I should apologise for two defects in the report which, as your foreign secretary, I have now the honour to lay before you.

The first of these is for the crude form in which my hasty notes must of necessity appear, as we are not yet in possession of the revised and official *compte-rendu* of the proceedings. The second apology is one, always due in connection with personal reports of discussions covering a very large field of diverse subjects, since no account so compiled can really be exhaustive, and the narrator cannot escape, any more than the reporter who attempts to describe a general action, the risk of giving special, and it may be undue prominence, to particular features coming most immediately under his notice, while bestowing scant attention on some equally important but less familiar topics.

The constitution of the International Institute limits its membership to 150 ordinary members, in addition to those on whom honorary membership has been conferred. The actual numbers now on the roll are 29 honorary and 147 ordinary members, whereof France claims 32, Great Britain 25, Germany 22, Italy 19, Russia 17, the United States 14, Austria 13, Hungary 7, and ten other States smaller quotas. Death had made some grievous inroads on the front ranks of the statisticians of the world since the Institute met in Switzerland in 1895, and several vacancies fell to be filled up at St. Petersburg. As the result of these elections we have seen two more of our own Fellows, my colleague in the secretariat, Mr. J. A. Baines, C.S.I., and our late Vice-President, Mr. Macdonell, LL.D., succeeding our lamented Presidents, Dr. Mouat and Mr. J. B. Martin, as members of the Institute, while Sir Robert Giffen, K.C.B., was promoted to the grade of honorary member, and our latest President, Mr. A. E. Bateman, C.M.G., who, with myself, has probably alone of our Fellows had the advantage of attending each session of the Institute at Rome, Paris, Vienna, Chicago, Berne, and St. Petersburg, has been called to the responsible and onerous post of Treasurer of the Association.

Another matter of gratification to this Society must be chronicled in the re-election to the Presidency of the International Institute of our much esteemed and indefatigable ex-President, Sir Rawson W. Rawson, to whose labours in the chair the Institute owes so much.

The sixth meeting of the International Statistical Institute was held in St. Petersburg on 30th August to 6th September, 1897, and (including five candidates who were duly elected members before the close of the session) the gathering was attended by 46 mem-

bers, representing twelve different nationalities. Of this number 16 were delegates appointed by the Governments of Denmark, France, Great Britain, Italy, Norway, Roumania, and Sweden. The session was also attended by 6 official delegates from Government Departments in France, and 1 each from Roumania and from the Grand Duchy of Baden, who were not also members of the Institute, and by 40 specially invited persons. Of the latter group 33 were Russian, of whom more than two-thirds held office in the Imperial Administration or were members of the Statistical Council of the Empire. The distribution of the several classes of statisticians present in respect of nationality may be conveniently shown as under:—

Country.	Members of the Institute.	Official Delegates included in Column of Members.	Official Delegates not being Members.	Persons Invited.	Total.
Austria-Hungary	5	—	—	1	6
Bulgaria	1	—	—	—	1
Denmark	1	1	—	—	1
France	12	9	6	3	21
Germany	7	—	1	1	9
Great Britain	3	2	—	—	3
Italy	3	1	—	1	4
Norway	1	1	—	—	1
Roumania	1	1	1	—	2
Russia	9	—	—	33	42
Sweden	1	1	—	—	1
United States	2	—	—	1	3
Total	46	16	8	40	94

Only three British members, it will be observed, took part in the proceedings, Mr. Bateman and myself representing our respective departments of H.M. Government, while our good colleague, Mr. Hendriks, who brought to our aid the valuable experience of having assisted at the St. Petersburg Congress of 1872, was in a position to represent the Royal Statistical Society.

It may be noted that the number of members (46) present at St. Petersburg was identical with the number attending the Berne meeting of 1895, while the roll of official delegates was larger. Of the countries represented at Berne two years ago, Belgium, Holland, and Switzerland sent no delegates to St. Petersburg, and Spain, Servia, and Argentina were the only other countries having members on the roll of the Institute which were not represented at the latest meeting.

The Institute was received in the Russian capital with the hospitality which has distinguished the administrators and people of the empire on similar occasions, and the labours of the

members were greatly facilitated by the arrangements made for their reception and convenience by the local committee of organisation presided over by M. Troïnitsky, the distinguished Director of the Central Statistical Committee at St. Petersburg.

The functions of Honorary President of the session were discharged by the Grand Duke Constantine Constantinovitch, who welcomed the members in the name of His Imperial Majesty the Emperor, and whose opening address gave prominent expression to the deep regret of the members that the health of the veteran President of the Institute, Sir Rawson W. Rawson, did not permit of his presence in the chair. He eulogised the study of statistics, and referred to the work of the Institute as the successor of the older Statistical Congresses which were held between 1853 and 1878. In particular, in illustration of the development of statistical methods, he drew attention to the success of the new census of the Russian Empire, whereby a population of over 129,000,000 souls was brought into enumeration in January last.

The Grand Duke's address was responded to by M. Levasseur, vice-president of the Institute, on whom, in the absence of the President through ill-health, the duties of the chair devolved. In an eloquent address M. Levasseur sketched the growth of the Institute since its formation in London in 1885, and described its composition as a body, combining the services of trained official experts and of eminent unofficial statisticians. The great services rendered by Sir Rawson Rawson in guiding the Institute —with a tact and energy which we in this Society have long had good occasion to recognise—to the position it now occupied were acknowledged, and the severe losses which the association had suffered since their last meeting at Berne, in the lamented deaths of Dr. Mouat, General Walker, Dr. Engel, and Messrs. Martin, Cossa, Costa, and Leon Say, were referred to with deep regret. In his speech M. Levasseur dwelt on the growing value of the public work of the Institute, and the personal services which it rendered to those engaged in like pursuits, in affording them opportunities of exchanging ideas and establishing valuable friendship—while alike for the independence of its private and unofficial constitution, and from its none the less close and cordial relations with Administrative Departments, the Association could offer advice freely to governments without attempt to impose its opinion. As an instance of the mutual benefit of their discussions, he cited the epoch-making census of the Russian empire which distinguished the present year, 1897.

The representative of the Minister of the Interior, Baron d'Uxkull-Gyldenbandt, welcomed the Institute in the name of Russian statistical departments, and claimed that his country had

not been inactive in the domain of statistics in the quarter of a century which separated this meeting from the eighth session of the older International Congress at St. Petersburg, in 1872.

Privy Councillor Yermolow, Minister of Agriculture and Domains, added his welcome, laying stress upon the special importance to Russia of agriculture and agricultural statistics. Some 90 per cent. of the Russian population were occupied in agriculture, while the value of the agricultural products of the empire had been put at a minimum figure of 10 milliards of francs (400,000,000*l.*). Agricultural statistics included estimates and records of the produce and distribution of crops, prices of grain and other products, wages of labour, &c.; and he saw with satisfaction the place accorded to such discussion in the programme.

Privy Councillor Troïnitsky, Director of the Central Statistical Committee and President of the Committee of Organisation, in welcoming the Institute, besought the members to bear in mind, when considering Russian statistics, the vast extent of territory and diversity of the races and conditions of the empire. He reminded the Institute that there were three methods of exploration in statistics—local, administrative or official, and international. The first, which explores a local district, with minute investigation as to the *personnel* and the conditions of existence of families, was in Russia of primary necessity, and the abundance of the material thus collected was needed to indicate to the government the varying character of the measures required to satisfy the diverse circumstances of the inhabitants of the country. Administrative statistics presented more difficulty in that country, owing to the diversity of nationalities and form of social life; and here the official statistics of Russia approximated to international statistics, in the endeavour to bring together a mass of facts of different kinds. Hence it was with the greatest pleasure that he saw the Institute at St. Petersburg.

Privy Councillor Séménow, vice-president of the Imperial Geographical Society, who had been a member of the International Congress since its foundation, alluding to the census of the empire, said that they had made a point of carrying out all the wishes of the statistical congresses on the subject of censuses, as definitely formulated at the meeting at St. Petersburg in 1872.

Privy Councillor Kauffmann welcomed the Institute on behalf of the Faculty of Law of the university of St. Petersburg, insisting that statistics had no longer to beg from governments as formerly, but that now governments demanded the aid of statistics. Of two great Russian problems—the enumeration of the population, and the improvement of the registers of civil condition—the first was now done, while the second would soon be equally dealt with.

The work coming before the Institute during the session was then, in accordance with the practice adopted at Berne, divided into four sections or groups, which, with the presidents they subsequently chose, stood as follows:—

Section I. Methodology, population, justice, and historical statistics. (President: Dr. Von Mayr.)

Section II. Agriculture and landed property. (President: M. Tisserand.)

Section III. Industry, commerce, colonies, precious metals. (President: Prof. Lexis.)

Section IV. Finance, credit, savings banks, &c. (President: M. Millaud.)

These sections met in the early part of each day, leaving the afternoons free for the general meetings of the Institute. In most cases the nature of the conclusions arrived at by the sections is indicated by the recommendations finally brought up for the approval of the general assembly; but as the minutes of their detailed deliberations are not yet available, I may be allowed perhaps briefly here to note the work of the section to which, as "reporter" of the standing committee on agricultural statistics, I was myself attached

Agricultural Statistics.

At its first meeting I drew the attention of its members to the repeated reports offered since the meeting at Rome in 1887, respecting the collection in one country or another of statistics showing the number, size, and distribution of the separate "Exploitations," *i.e.*, separate holdings, farms, or undertakings by which the agriculture of each State was conducted; and laid on the table copies of the returns which were lately issued by the government of this country, giving the result of a special inquiry by the Board of Agriculture into the number, size, and distribution of agricultural holdings in Great Britain in 1895. The heads of information therein given were examined as regards the method of classification employed, the endeavour to show the proportion of arable land and pasture which each holding contained, and the extent to which the land of each holding was occupied by the owner of the soil, or by a tenant.

On the latter point considerable discussion arose as to the wisdom of recommending a general inquiry, in all countries, respecting the actual distribution of the ownership of land, and Professor Conrad submitted a detailed proposal for such an investigation, which he desired should have regard both to the extent and to the value of each landowner's possession, whether urban or rural. A somewhat similar proposal was submitted to the Section by

M. Rheinbott, who subsequently brought up to the general assembly a *résumé* of his elaborate work on the recent movements of landed property in Russia between one social class and another. After examining the nature of the investigation proposed, and noting the great difficulties, which M. Inama-Sternegg and others pointed out, in the way of uniform inquiry on so wide a topic, owing to the dissimilarity of the bases of information available in different countries, it was decided to leave this question over for more detailed consideration by the standing committee, before whom M. Conrad undertook to present a form of *questionnaire* to meet his object. The sanction of the general assembly of the Institute was subsequently accorded to this arrangement.

The other questions coming before the Agricultural Section embraced the preliminary examination of papers subsequently communicated to the assembly, such as the report of M. Pilat, and the communication of M. Timiriasew on Crop Reports, and a memorandum submitted by myself on the need of an annual publication of agricultural statistics. The Section took note also of a communication handed in (to be subsequently printed) by Mr. Edward Atkinson on the agricultural position of the United States of America, with special reference to the mortgages on landed property.

As in this *résumé* of a Section's work I have given prominence to agricultural inquiries, I may perhaps be forgiven if, departing from the strictly numerical or chronological order of the subjects dealt with by the Institute, I proceed here to refer to the substance of the agricultural papers subsequently communicated to the general assembly, and the discussions which they provoked.

Methods of Collecting Crop Reports.

M. Pilat, Director of the Provincial Statistical Bureau of Galicia, being unable to be present at St. Petersburg, submitted a report in which he referred to the conclusions at which the Institute had arrived at Berne, on the proposals he then submitted respecting the method of collecting agricultural statistics. These conclusions, it may be as well to recall specifically here, were to the effect that, while the system of an annual direct ascertainment of the area under each crop by schedules collected from each individual holding, as in Great Britain, was the most ideally complete statistical method, in countries where, as was so generally the case, this could not be done, it would be preferable to have an exhaustive ascertainment of the facts and areas once in five or ten years, rather than to trust to a general estimate made every year without local survey. If partial inquiries had to be made the facts should be ascertained by direct investigation on as large

a number of farms as circumstances permitted, and estimates allowed only for such data as were wanting.

On this point M. Pilat informed the Institute that action had been already taken in Galicia in the past year, for the method of inquiry by schedule had been extended to all seigneurial property, which, with rare exceptions, included all properties of more than 117 hectares (290 acres). Over 4,000 schedules had been sent by post, of which nearly half were returned within a month, and two-thirds of the whole were expected before the inquiry closed. As directing an annual inquiry in Great Britain, which involves the use of more than 500,000 occupiers' schedules annually, I may be allowed to welcome any beginning of this nature, but to point out that the limits to which the Galician Department had found it needful to confine their direct inquiries points to the great difficulty, not always recognised by us here, in the way of perfecting the agricultural statistics of many continental States, where the great mass of the cultivators of the soil have very small holdings, and too often have neither the ability nor the disposition to aid in supplying information.

In the communication made to the Institute this year, M. Pilat deals with the advantage of organising periodic monthly or even fortnightly reports, by way of forecasts of the condition of the growing crops. As examples he cites—what some of us here would hesitate perhaps to call—the success of the United States of America in the practice of forecasting; and he adds that in his own country of Austria the Ministry of Agriculture have collected fortnightly reports for more than twenty years through the agency of the agricultural societies or provincial agricultural councils—a second network of agents reporting directly to the Ministry having been employed in Austria as a check during the last four years. Germany since 1893 had obtained by the use of post cards a series of monthly reports of crop condition from April to November, with preliminary estimates of the harvest yields in September, October, and November, prepared by reliable experts chosen by the governments of the several States on the recommendation of the agricultural societies. This practice M. Pilat prefers to the collection of periodic crop reports through administrative channels, as by the Prefects of Departments in France.

None of these current estimates, although valuable for checking exaggerated and incorrect opinions, would dispense with the necessity of final returns of the ascertained yield of the harvest. These, he urges, every State should secure for all the larger crops, with estimates of areas from which the crops are actually harvested, due regard being had in calculation to the extent of area to which the estimate of yield applies.

As a final conclusion he presses the point that no estimates of crop results can be accepted as sufficiently accurate, unless the area taken as the basis of cultivation has been determined by exact inquiry.

M. Pilat's views were necessarily considered in conjunction with a further contribution to the same section by M. Timiriasew, the Director of the Division of Statistics and Rural Economy in the Russian Ministry of Agriculture. In that he claimed a system of crop forecasts as of special importance, in view of their bearing alike on agriculture, on commerce, and on the food supply of the people.

He indicated two differences in the mode whereby data of this class were collected by the Agricultural Departments of different States. The information is obtained in some States by direct administrative means, with or without the co-operation of agricultural societies: in other countries the data rest on the collected opinions of special voluntary correspondents. Neither class of estimates, he very properly observed, has any claim to rank with statistical results obtained by a direct census—a point I fear too often forgotten by commentators in the press of all countries. They remain but opinions, more or less closely approximate according to the number and the honesty of the agents supplying them —and M. Timiriasew seemed to hold that there was nothing to indicate that the voluntary correspondents did not merit the preference. Another cause of the merely approximate character of crop estimates was the impossibility of getting in good time reliable data of the actual area presented as a basis for the calculation.

None the less he urged that, as well as final estimates, preliminary *forecasts* should be attempted, as a matter of importance to both producing countries with a surplus to dispose of, and consuming countries importing grain. But he urged greater uniformity in the mode adopted by the different governments in publishing their estimates. The form of final estimates was nearly uniform—a rate of production per unit of area, and an aggregate total production in absolute figures. Only a uniform system of weights and measures, such as the metric system could improve this.

Among countries giving monthly, during the period of growth, provisional estimates of the forthcoming harvest, were the United States, Germany, and Austria-Hungary, while France and Russia, according to M. Timiriasew, were attempting to do so.

These estimates were given in three different ways—by means of verbal statements, by means of marks (numerically expressed

in figures), or in percentage, each of these methods presenting variants.

Verbal estimates he instanced as adopted in Italy, Austria-Hungary, and in Russia. In the two latter countries the following seven terms or categories are employed:—

Austria-Hungary.	French Equivalent.	English Equivalent.
Sehr gut	Très bon	Very good.
Gut	Bon	Good.
Gut mittel	Assez bon	Good average.
Mittel	Moyen	Average.
Schwach mittel	Passable	Under average.
Schwach	Mauvais	Bad.
Sehr schwach	Très mauvais	Very bad.

Here the meaning of "average" has no definite signification.

The plan of estimate by marks was that adopted in Germany, which admits of 5 marks (with decimals), as follows:—

1. Very good; 2. Good; 3. Satisfactory; 4. Inferior; 5. Bad. Here the idea even of *an average* is wanting altogether.

Lastly, we have an estimate in percentages such as is adopted in France and the United States, and now being followed in Holland. In France the system, although presenting the appearance of a forecast in percentages, is really a combination of the two preceding systems.

100 = very good.	50 = "passable."
80 = good.	30 = inferior.
60 = fair.	20 = bad.

In the United States the forecast is in percentages, 100 being taken as corresponding to what is called a "full average crop." This, as M. Timiriasew very properly pointed out, is a very vague term, and it is an expression which I confess I have seen with some regret employed in place of an ascertained average as a standard in some of the unofficial estimates which the newspapers of this country have adopted.

The weak side of all these estimates lay in the diversity and indeterminate character of the notation, and the instability of the bases on which they rest, and which M. Timiriasew maintained ought to be identified with the *average* of the harvest. Usually the basis of comparison is taken to be the average of the preceding ten years, but he questioned the absolute justice of this system, which if more or less correct for States where the yield varied comparatively little from year to year, was not admissible in a country with a production so extensive, and a climate so variable as Russia, where the range of variation in the yield of the soil reaches 300 per cent. In this last

case, an average established in this manner, while being mathematically true, would have no real value, and it would be needful either to carefully eliminate exceptional years, or else to have recourse to personal estimates of a normal average made by competent agents on the spot. With this object the Russian Minister of Agriculture has addressed questions to its numerous correspondents to determine what may be considered an average crop in each locality and for each producer—an attempt which recalls to my mind, and possibly to some of our members, the description which I gave to this Society in my paper on "Statistics of Agricultural Production" in 1883, of an unofficial attempt in the same direction which I made in 1882 with the aid of 800 voluntary correspondents in Great Britain. M. Timiriasew also referred to the possibility of making the dates of publication of the forecasts coincide as well as the final results of the harvests in different countries. But he rightly himself appreciated the difficulty arising from the fact that, taking the case of wheat alone, the market was constantly extending, already embracing nearly the whole world, with harvests distributed over all the twelve months of the year.

In the discussion which followed these papers, M. Tisserand, speaking with the remarkable authority which his long and distinguished tenure of the post of Director of Agriculture in France conferred, explained the French method of crop estimates, under which the cultivators from whom information was sought compared their estimates with the results of the immediately preceding harvest, which alone was fresh in their memories, a simpler and therefore preferable method to a reference to any "average," which must involve a calculation more or less complicated.

Another eminent authority, M. Von Inama-Sternegg, acknowledged the strength of this opinion on the ground of practical facility, although that of M. Timiriasew presented the more scientific character, while M. Von Mayr preferred M. Tisserand's view to that of his Russian colleague, on the ground that it was impossible each cultivator should retain an exact view of what an "average" crop was, and the central bureau could itself subsequently convert any estimate given into relation with an assumed average figure. To this M. Timiriasew rejoined that his point was rather as to the mode of recording and publishing the forecast with direct reference to an ascertained average, than of collecting opinions from the growers in the first instance. Among other speakers Professor Conrad took occasion to eulogise the American system, giving forecasts before the final valuation. Their mode of procedure enlisted the interest and help of the cultivators them-

selves. He alluded also to the value of a periodic inquiry on stocks of grain as the best check on harvest estimates.

The Institute finally agreed with M. Timiriasew in asking the agricultural committee to further study the question how far a more complete understanding between the various administrations collecting crop statistics, would be possible for the publication of their data in a more uniform manner, and at short and definite intervals.

Annual Records of Areas and Live Stock.

In connection with the questions coming under discussion in the agricultural section, both at St. Petersburg and at Berne, respecting the proper period and best methods of collecting statistics of agricultural produce, I laid before the Institute three tables designed to show in a concise form what was the present position of each country as to the frequency of its ascertainment of the area of the crops grown, and of the number of live stock.

I have reproduced these tables in the Appendix to this paper (p. 771–3), and I would submit that, apart from their primary use in exhibiting the extent to which comparable data are, or are not, as a matter of fact available, for successive years in the several countries named, the particulars given are also in themselves of interest in presenting a more or less complete picture of what we know, from official sources, respecting the extension or contraction of the areas under wheat, and regarding the development or the reduction of the stock of cattle and of sheep in each country over the whole period of thirty years from 1867 to 1896 inclusive.

As regards wheat areas, which I take as a sample of what is generally recorded respecting the areas of the cereal crops, it will be observed that only as regards five countries out of twenty—*i.e.*, the United Kingdom, Australasia, France, Holland, and the United States of America, do we possess, so far as the data reaching my own department here from official sources are concerned, a complete or nearly complete series of *annual* records going back to 1867. Coming next in degree of continuity of record we have the annual figures from Austria, and less fully from Hungary. From 1878 the German empire has supplied continuous annual reports, and similar serial data have been more lately begun in some provinces of Canada, in India, Roumania, Sweden, Italy, and Russia. Recent reports from Algeria, and even from Japan, suggest that the example of an annual record of areas may be in future hoped for from regions less statistically familiar to ourselves. Elsewhere, and in some of the countries named, before the beginning of consecutive statistics, the areas on which wheat was grown were apparently ascertained only by inquiries made

at more or less long intervals and for particular years—which may or may not have been typical or normal in their climatic and other conditions. Perhaps the most defective case is that of Belgium, where the wheat area appears to be recorded only twice in thirty years, and to be unknown for any year subsequent to 1880.

In view of the annual attempts now made nearly everywhere to estimate, with more or less elaborate machinery, the production of wheat in each season—such as are the subject of suggestions in M. Pilat's and M. Timiriasew's papers—I had urged on the section the primary need of some endeavour to record the actual area whence each year's harvest was obtained. As an illustration of the danger of selecting single years not necessarily typical, I might point to the fact that the almost perfectly uniform area of wheat credited to France over thirty years, 17 to $17\frac{1}{2}$ million acres, was nevertheless broken by the single notable exception of the crop of 1891, when, solely from peculiar climatic conditions, only 14 million acres of this cereal were reaped. Had France been, like Belgium or some other States, content to assume a single year's recorded area as a normal standard instead of making yearly inquiry as to variation of areas, and had the date selected fallen on the year 1891, it is easy to see how wide an error must have been introduced into any subsequent calculation of produce on the basis of an entirely exceptional state of matters.

In like manner, in my second and third tables it may be seen how the absence of continuous annual statistics of the numbers of cattle and sheep leaves room for the occurrence of considerable changes which, in default of annual enumeration or estimate, may remain unknown to the countries themselves, where a census of animals taken only at comparatively distant dates is relied on.

The practice of our own country and our Australian Colonies is in accord on this point with the records of France, Holland, and Sweden in Europe, and with the United States of America only, and the wide gaps in such important live stock owning countries as Russia, Germany, Italy, Austria, and Hungary, indicate the danger to the statistician who may be making an estimate of the total herds or flocks of the world at any given date, from the absence of annual particulars. An examination of the tables shows the numbers of live stock are by no means free from considerable periodic variation.

Apart from the lesson these tables teach as to the value of a strictly consecutive series of international statistics, I may be forgiven in view of the interest felt in the agricultural changes of recent years, in inviting some attention to the figures themselves,

and to the apparently stationary aspect of wheat areas not only in Europe but latterly in America. The tables suggest increase in some, but not in all, countries of cattle, and a very general decrease in the flocks in continental Europe, a decline which in the more recent years extends to the United States, although happily it is not so perceptible in our own mutton eating island, which absorbs, as we know from other sources, so large an importation from the expanding flocks of Australasia and Argentina.

Statistics of Russian Landed Property.

M. Rheinbott having, in 1895, been appointed by the Russian Minister of Finances, in connection with a revision of the statutes of the Peasants' Agricultural Bank, to collect and examine certain statistical data concerning the distribution of landed property among the different classes of the population, submitted an instalment of a special study that he had made of the sales and purchase of land occurring in Russia in 1893. The data were based on the judicial notices of the Senate referring to the transfer of properties, which gave both the name and the social position of the seller and purchaser, the quantity of land sold, and the price. The available figures, though for one year only, related to no less than 34,443 separate transactions, and indicated, so far as they went, a slow but important change in the distribution of landed estates in Russia.

The total sold by the class of nobles was 2,091,412 *déciatines*, while the purchases of that class were 1,104,411 *déciatines* only. The holdings of this class had therefore diminished by a million *déciatines*, or, roughly, 2,700,000 acres, in a year. The sales of land by nobles were also mainly of large areas, only 1·7 per cent. of the area transferred, or about 100,000 acres out of 5,646,000 acres, being in lots of less than 25 *déciatines* (67·5 acres).

In the year 1893 several communes appeared as purchasers of land to the extent of 63,535 *déciatines*, these sales being only 23,126 *déciatines*, showing a net increase in holdings of this description of over 40,400 *déciatines*, or 109,000 acres. A more active movement is recorded in the purchases of land by special associations of the peasants, these co-operative groups acquiring 331,517 *déciatines*, and selling only 40,626 *déciatines*, in 1893, a net addition of 291,000 *déciatines*, or 786,000 acres.

There is, however, yet another feature of note recorded in M. Rheinbott's figures—the purchase of land by the wealthier persons belonging to the nominal peasant class. Their transactions in lots exceeding 25 *déciatines* each, and reaching in some instances 2,000 and 3,000 *déciatines* apiece, and even occasionally still higher figures, are numerous. The purchases being 284,347

déciatines, and the sales 145,056 *déciatines*. A like increase is indicated in the land holdings of the classes defined as "petit "bourgeois," and "bourgeois notables," while the merchant class in Russia, as in some other countries, would appear to have been comparatively active in possessing themselves of some portions of the territory passing out of the nobles' hands—their purchases reach 528,521 *déciatines*, against 295,419 *déciatines* sold.

So far as they go these statistics, which were noted with interest in the committee of the Institute on landed property, undoubtedly point to a reduction of the amount of land owned by the nobility, a slight increase of property owned by rural communities, and a very evident extension of landed property owned especially by individuals belonging to the merchant and even to the peasant classes, but in economic circumstances entirely different from the status of an ordinary peasant labourer.

Rural Inquiries.

The local statistical work of the Zemstvos or district councils of Russia formed the subject of a very interesting publication by the Central Statistical Committee, and the attention of the Institute was drawn to some of the features of these researches by a note communicated by M. N. T. Annensky. Created by the organic law of 1864 at the epoch of the great reforms then made in Russian rural life, the Zemstvos had been entrusted with large self-governing powers, and found it needful to set to work to collect, as has been done throughout the past thirty years, an almost infinitely varied series of inquiries of a statistical and economic nature, for the purpose of obtaining the necessary information respecting the social life and conditions of the peasantry. Statistical inquiries of some sort have been in progress in 31 out of 34 provinces possessing Zemstvos, local statistical bureaux being at present established in 25 provinces. An attempt to bring the figures together was made in 1894, by which time the publications of the Councils had already reached 600 volumes. A form of economic census had then been made in 182 districts of the 25 provinces, dealing with 80,000 villages, containing 4,300,000 households and over 25,500,000 persons, and if all the data collected and printed concerning village economy were included, detailed observations must have been made over nearly 5,000,000 households. It is obvious that in the space I have at my command here, it would be impossible to do more than direct attention to the mass of information which is being accumulated by the machinery thus set to work; but I would venture to suggest that even the descriptions of what is being done and of the methods resorted to,

might usefully be studied hereafter from the memoranda submitted to the Institute.

Professor Tchouprow of the University of Moscow, in a separate paper, drew attention to a series of suggestions in connection with the proposed scheme for a universal census of 1900, for a parallel inquiry into the conditions of popular life in the different countries of Europe, especially in the case of the rural populations.

He urged that from fifteen to twenty years would have passed since agricultural inquiries had been held in most of the principal European States on the scale of the Italian inquiry towards the end of the decade 1870-80, the French inquiry of 1882 and the English Commission reporting about the same date, while many changes had since occurred, which were more particularly pronounced at present owing to the growth of agricultural depression.

Here however the professor had no doubt overlooked the completion of the French inquiry of 1892, of which the tables are only now beginning to appear, and the still more recent and exhaustive reports of the English Royal Commission on Agriculture just issued.

Dealing with the rural position in Russia, the local statistics organised by the Zemstvos were no doubt voluminous, but mostly collected some time back, and many in 1870-80, only to a certain extent completed by current data, while so many were the changes since the emancipation of the serfs, that a general inquiry was particularly called for. The patriarchial customs of Russian rural life were disappearing. Formerly nearly all the population of the villages devoted themselves to agriculture; now factories and mills were springing up, and the rapid growth of certain towns was evidenced by the figures of the census. The old three course system of rotation was being abandoned around Moscow, and fodder plants were being cultivated. Better implements were in demand, and in the south the upper class of peasants now rarely dispensed with threshing and reaping machines, and where the peasants were unable to purchase these individually, they were co-operating in groups for the purpose. Changes were occurring in the distribution of landed property, and in common lands, the land of the *mir* was being no longer apportioned, as formerly, according to the number of males, or even the number of able bodied men, but to the number of mouths in the parish. Alongside of the communal possessions, free associations were being formed to buy or lease farm lands. The old equality of fortune distinguishing the earlier rural life was passing into the sphere of legend. Such statistics as there were showed that the differences in wealth in the country were tending to increase. In view of such changes as these M. Tchouprow proposed:—

1. That the end of this century and beginning of the next should be commemorated in all the countries of the civilised world by detailed local inquiries of popular life, particularly agricultural.

2. That the inquiries should be separately made for each household.

3. That while the data by households could be compiled in general tables, detailed descriptions should be obtained of one or more typical households in each particular district, including complete data on the budgets, and real and personal property of each household.

4. That to secure as much uniformity as possible in these inquiries, their execution should be confided to special statistical agents rather than amateur volunteers or mere printed schedules.

5. That where, as in Russia, such inquiry was confided to autonomous civil institutions, it would be necessary that the national statistical societies should formulate a limited number of fundamental questions, reserving to the competent institutions the right to complete and extend the programme.

6. That where inquiries into popular life have been already undertaken, as in Baden and Würtemberg, it was desirable that the new work should conform as much as possible to the earlier, so far as concerns both the choice of localities and the programme.

The wide range of the professor's proposals provoked some criticism, M. Bodio indicating that it would not be easy to persuade the parliaments of the various countries to find funds at once for a census and a general agricultural inquiry. He alluded, however, to the German practice of interposing a "Gewerbe-Statistik" in the intervals between the classification of occupations. M. Tarde could see no utility in linking an agricultural inquiry—a purely social investigation with the census—and the line of division between centuries possessed no scientific importance, and did not correspond with any historical period. M. von Mayr, while differing from some of M. Tarde's opinions, attributed importance to M. Bodio's suggestion, and, supported by M. Bertillon, proposed that the whole subject be referred back to the second section for examination by the competent committees.

Among the communications relating to agricultural subjects, one by M. Pokrovsky, of the Russian Customs Administration, deserves a longer notice than it is possible here to afford, as it offers a mass of statistics not previously published, indicating the relation between the movement of population in Russia and the quantity of each year's harvest and the prices realised. I have given in the appendix an abstract of one of his tables.

Population Statistics.

These partial population statistics and the proposed survey into the conditions of rural life in 1900, lead up to the reports bearing on the proposal of the Berne meeting of the Institute, for a synchronous census of population throughout the world in that year. The report of Dr. Guillaume, whose absence in person from the St. Petersburg meeting was a matter of much regret to his colleagues, dealt with the replies received from various countries to the proposition for a universal census. A summary of these answers was reported by M. Körösi on behalf of the first section. Favourable replies were received from Norway and from Sweden, where the census would occur in any case on the 31st December, 1900, under the law of 1859, while Denmark intended to range itself with its Scandinavian neighbours in this matter; Finland also agreed, and Belgium regarded assent as probable. The reply from Hungary gave hope that the government would agree. Brazil reported favourably, since its census fell, in any case, to be held in each year ending with "0." Portugal for a similar reason was altogether favourable, and Uruguay assented to whatever was decided, while Japan regarded the step as possible.

Spain on the other hand considered a further census than that of 1897 as impossible. Roumania was unable to give a definite reply. In Italy the already delayed census would probably have to be taken at an earlier date.

England and her colonies could not, it was stated, alter the date of April, 1901, for their next census, while Russia having just completed her general census of 1897, could not possibly renew that operation in 1900. France does not appear in the list, but M. Moron, on the subject coming before the Institute, gave it to be understood that the date of April, 1901, already fixed in France, as in England, would not be varied.

M. Körösi then submitted the detailed suggestions of the first section for a uniform scheme on the universal census proposed, and the dealing in a uniform manner with the figures after collection. These conclusions of M. Körösi, which are very voluminous, were adopted.

M. Körösi communicated also some notes, based solely however on data collected in the city of Budapest over a period of five years, by which he endeavoured to show the varying influences of race and of religion on twenty-four different causes of death—the figures were however complicated by preponderance of particular occupations in specific groups of nationalities or creeds. He added a table classifying, again, according to religions, the number of insane persons per 100,000 inhabitants in Hungary in 1891, with

a note of the number of illiterate persons among each creed. The proportion of insanity was greatest among the Jews, 103 per 100,000, and the Lutherans, 80 per 100,000, in both of which classes the number of illiterates was small, while insanity was least apparently in the ranks of the Greek church, 43 per 100,000, where the proportion of illiterate was between twice and three times greater than in the religions above named.

In another paper on vital statistics M. Körösi raised also the question of the standard population, explaining that as any country might be adopted as standard, Sweden had been selected, on account of the vital statistics of that country extending furthest back. He admitted also that his proposition, that the standard population should be corrected every ten years, was not advisable; as, however, the Institute had not endorsed this point, the objections raised on that account fell to the ground.

M. Bortkévitch opposed the idea of a standard population. By M. Körösi's system it was proposed to correct the death-rates of a country by making allowance for the various distribution of ages among different peoples, but M. Körösi's method did not eliminate the question of ages, since the distribution of age depended not only upon the births, but also on the mortality itself.

A note by Dr. J. Bertillon drew the attention of the Institute to certain conclusions he had drawn as to natality according to the degree of comfort in great European capitals. In so far as the statistics of large towns enabled a distinction to be drawn between social classes, the rich and the poor tending to live in different quarters, he found that the births per 1,000 women aged 15 to 50 per annum, in different quarters of the four under noted cities, yielded the following comparative results :—

Classification.	Paris.	Berlin.	Vienna.	London.
Very poor quarters	108	157	200	147
Poor quarters	95	129	164	140
Comfortable quarters	72	114	155	107
Very comfortable quarters	65	96	153	107
Rich quarters	53	63	107	87
Very rich quarters	34	47	71	63
Average	80	102	153	109

It thus appeared that in each of these four towns the birth-rate in the very poor quarters was about three times that in the very rich. M. Bertillon held that these distinctive differences were not due in any way to the summer migration of the rich.

Among the papers dealing with population statistics, it would

be invidious to overlook a contribution to the better knowledge of the numbers of the Roumanian people supplied by M. Basilescu, who, on the authority of the researches of M. Stourdza, permanent Secretary of the Roumanian Academy and President of the Council of Ministers, announced a most important correction in the former estimates of the inhabitants of that kingdom, which places the total at 6,919,738—or excluding the trans-Danubian province of the Dobroudja, added in 1878, 6,645,023—a very considerable rise from the 5,035,000 formerly estimated by the Roumanian Statistical Office, or even from the 5,406,000 of Dr. von Juraschek's calculations, or the 5,800,000 which I think is the latest figure in our own statistical publications.

The General Census of the Russian Empire.

The most interesting communication made to the meeting, both from the international and Russian point of view, was probably the account given by M. Nicolas Troïnitsky himself, of the methods and preliminary results of the recent Russian census. The decree authorising this census was sanctioned by the Emperor on 5th June, 1895, and the work was carried out by a Central Commission, under the presidency of the Minister of the Interior, M. Séménow being vice-president; while in his capacity of director-general, M. Troïnitsky was in actual charge of the operations. The Census Budget amounted to 3,916,682 roubles, or 400,000*l.*

In each province and in each arrondissement were appointed special commissions for their respective territories—a few large towns being also provided with separate commissions of the second order. There were thus 96 provincial and 757 arrondissement and town commissions. Each arrondissement was divided into sections, corresponding as far as possible with existing "cantons," with a chief, under whom were the census agents. The sections (7,000 in all) included from 15,000 to 30,000 inhabitants as a rule. The returns of large institutions, barracks, railway companies, &c., were of course specially dealt with.

Each census agent had to enumerate a population which normally did not exceed 400 households (or 2,000 inhabitants) in the country, and 150 "lodgings" (or 750 people) in towns. The remuneration, 12 roubles per agent in the country, and 7 in the towns, proving insufficient to attract an adequate number of census agents, a special medal was struck for voluntary unpaid agents, and the required number was thus made up.

The Central Commission settled the forms employed, and issued all the schedules. A household, rather than an individual schedule, was adopted, and three forms, of which samples were

given to members of the Institute, were printed in the various languages required; one form was for peasant households, one for all other households which were not urban, and the other for urban households. The particulars required embraced the name and christian name; sex; relation to head of household; age (years and months); civil condition; social position or class; place of birth; place of registration; ordinary domicile; information as to temporary or prolonged absence (where the person was not at his usual domicile); religion; mother-tongue; degree of education (*a*, ability to read; *b*, particulars as to place of education); occupation (both principal and subsidiary, including condition in respect of military service). Questions were put also as to the substance of which each house was built, and the material with which it was covered.

The particulars required as to the "place of inscription," were designed so that the legal population domiciled in each village as distinct from that temporarily present could be ascertained.

In the towns it is stated that the answer to the questions in the schedules were usually filled in by the householders themselves. The distribution of the schedules in large towns was made five days, and in smaller towns ten days, before the census date. When replies were not filled in they were taken by the census agent from the mouth of the householder or his representative at the moment, and recourse to other information was forbidden. In country districts the enumerators began to fill in the returns twenty to thirty days beforehand, and on the actual census day, the 9th February, 1897 (of the Russian style 28th January), they went round finally a second time to record any changes that might have occurred since. The schedules were then returned to the chief of the section, who made out the summary totals for the section, for transmission with the schedules themselves to the special commissions, after making duplicates in case of accident. The commissioners in their turn checked the sectional results, made up their totals and forwarded them to the central commission.

Some modification of the system had, owing to climatic conditions, to be made for some localities in the north, in Siberia, and in the Caucasus.

The Central Commission was enabled to publish the preliminary returns on the 28th April (10th May), and in August it had begun to work out the final results with 70 Hollerith machines, 35 of which had been purchased by the commission and 35 obtained on hire.

The chief results of the preliminary enumeration by the local commissions of districts and towns, are as follows:—

Country.	Number of Governments.	Population.	Density per Square Mile.
European Russia	50 governments	94,188,750	50
Poland	10 ,,	9,442,590	192
Caucasus	11 ,,	9,723,553	54
Siberia	9 ,,	5,731,732	1
Steppe regions	5 ,,	3,415,174	4
Transcaspia and Turkestan	4 ,,	4,175,101	9
Russian subjects in Khiva and Bokhara	—	6,413	—
		126,683,312	15
Grand Duchy of Finland	—	2,527,801	20
Total of the Empire	—	129,211,113	15

Compared with previous estimates of populations (based chiefly upon returns of taxable persons), the increase in the population has been 96 per cent. since Keppen's calculation of 1851, 73 per cent. since the estimate of the Central Commission in 1858, and 18 per cent. since the like estimate for 1885.

The average density of population in the empire on the basis of the new census figures was very effectively illustrated by a coloured map exhibited to the members of the Institute, showing the great variations per square verst, which are indicated (per square mile) in the preceding table. The distribution of the population varies considerably in different governments within the groups just shown. The 50 governments of European Russia contained four provinces of which the density was under 11 persons per square mile, and six provinces where the density exceeded 136 persons per square mile; and the minimum of population was recorded in the government of Arkhangel—the maximum in Volhynie, where it approached the Polish average.

In European Russia and in Finland 102 women were enumerated to 100 men, in Poland only 98·6 per 100 men, while in all the eastern regions the men appear still more numerous than the women, so that in the whole empire the men form an actual, though very slight, majority. There are however interesting variations on this point in different districts. Some of these may be found in the summary of the tables which I have thought it useful to reproduce as a record of this famous statistical work, in the Appendix to these notes (Tables IV and V).

Crime and Justice.

M. Bodio presented the Report of a Committee on Criminal Statistics, which conveniently reviewed the efforts of the International Institute to secure uniformity in the criminal statistics of

different countries. It was necessary to distinguish carefully between crimes (*délits*) properly so called, and mere infractions of the code which could not be regarded as serious offences. The number of these contraventions must inevitably increase as new laws on sanitation, hygiene, education, &c., were added to the statute book, and municipal regulations were extended to new subjects; although this increase would not by any means prove that the criminal condition of a town or country had deteriorated. M. Bodio quoted England as an instance of a reduction in the number of crimes properly so called, while in the same country breaches of the Education Acts increased from 56,000 in 1880 to 62,000 in 1894.

Criminal statistics have continuously improved in all countries. Germany continues to collect statistics by means of the individual bulletin. Italy adopted the same method in 1890, and has further added to it a special bulletin for each penal offence proved, but in which the author of the crime has not been discovered. In England several improvements have been introduced in the records, and they now contain references to the statutes and acts concerning the different offences. M. Bodio was able to present to the Institute a work on comparative criminal statistics by M. Bosco, of the Italian Statistical Bureau, bearing upon four groups of offences, viz., 1, homicide; 2, assault and wounding; 3, rape and attempts; 4, theft, robbery with violence, and extortion. These criminal data are available in the greater number of European States, and M. Bodio stated that the work could be extended to other offences against the person, and to offences against property, as well as embezzlement, breach of trust, &c. Referring to the Rev. W. Douglas Morrison's work on "Juvenile Offenders," M. Bodio thoroughly endorsed the opinion there expressed, that it is only on this class of delinquents that the preventive action of the State can be profitably exercised. A very serious side of this question was the suggestion of several eminent French writers, that the criminality of children and young persons was increasing.

On the question of recidivism, which had also been occupying the attention of the International Institute of Criminal Law, two elaborate reports having been presented on the subject by M. O. Hübner, of Berlin, and M. G. von Mayr, M. Bodio had also himself drawn up some statistical parallels for several States, and included them in his report.

One of the most important advantages in the method of individual bulletins in conjunction with bulletins of each case, was that by which the movement of criminality for each year could be exactly determined in the different phases of information, trial, and sentence. Without these bulletins only vague approximations

could be made. The adoption of the individual bulletin system enables the criminal budget to be ascertained with just as great precision for the number of offences actually committed, even though the authors may not have been discovered, as for the verdicts pronounced in the presence of the accused.

In the discussion which followed, some expression of dissent on the part of M. Tarde to the use of individual bulletins, led to an emphatic endorsement of M. Bodio's recommendations on this head by M. von Mayr and by the President, M. Levasseur.

M. Albanel followed with a paper on the treatment of juvenile criminals, and gave a *résumé* of his conclusions from a series of statistics he had collected respecting the children under 16 years of age brought to trial in France as a whole from 1887-94, in the Department of the Seine, 1887-96, and of cases coming before M. Albanel himself, as *juge d'instruction* in Paris, in the first six months of the current year. He sought to prove that short penalties for offences by minors must be abandoned, that each case of an offender under 16 should be dealt with by a *juge d'instruction*, and that courts of law should only regard a criminal of 16 years and under as having acted with discernment in exceptional cases. The methods for prevention of juvenile crime and for the protection of children in France were noticed, and a claim preferred for special statistics in each country respecting the legal age of discernment for each particular crime, and the age and disposal of convicted children—with details as to the moral and social position and degree of education of juvenile criminals, and the position of their parents.

M. Tarnovsky read a paper, which presented features of special interest, on the proportion of Acquittals to Offences and Crimes in Russia from 1889-93. He thought that sufficient attention had not hitherto been given to the numerically recorded results of the different systems of jurisdiction in vogue in the great European countries. There were difficulties owing to varied forms of criminal procedure, but points for comparison might be found in such questions as the relative proportion of acquittals by different tribunals.

In general there were more acquittals in trials by jury than without. He gave a table illustrating this by the proportion of acquittals for every 100 persons tried in a court of first instance in the following countries:—

	With Jury.	Without Jury.
Russia (1889-93)	34	26
France (1889-93)	29	7
Austria (1883-93), excluding Hungary	26	14
Germany (1889-93)	25	13

These figures were however not entirely homogeneous, as in Russia notably the *tribunaux d'arrondissement* try in the first instance more than half their cases with the assistance of a jury, whilst in the other three countries the number of cases tried by a jury does not exceed 5 or 6 per cent. of the total cases tried by a court of first instance, and in France the proportion is even less than 3 per cent. But if only those cases are taken for Russia, which are tried both in France and Russia equally with the assistance of a jury, the proportion of acquittals for Russia would be 32 per cent., as against 29 per cent. for France.

The figures quoted show that both jury and magistrates are more indulgent in Russia than in Western Europe, but it is especially remarkable that the difference is much greater for the courts which try cases without the assistance of a jury, than for those which have a jury. Moreover, in Germany and Austria the jury acquits twice, in France as much as four times, as often as the State tribunals (*tribunaux d'État*); in Russia the jury only acquits to an extent of one-third more than the magistrates.

The high proportion of acquittals in Russia is due to a variety of reasons, which render criminal procedure slow and insecure: chief of these is the immense area of the different judicial districts which on an average occupy in Russia 40,000 square kilomètres, while in Germany and Austria they consist of 3,000 to 4,000 square kilomètres, and in France of only 1,000 square kilomètres. In the same way a court of first instance in Russia has to deal with 1,200,000 inhabitants, in Austria with 370,000, in Germany with 300,000, and in France with only 110,000.

The greater indulgence of a jury becomes especially noticeable when regard is had to the sex of the accused. In Russia juries, on the average, for the period 1889-93, acquitted 34 per cent. of the men, and 51 per cent. of the women. The corresponding acquittal figures for France during the same period were 25 per cent. men, and 49 per cent. women. Magistrates, on the contrary, hardly make any difference between the sexes. In Russia they acquitted 26 per cent. men, and 25 per cent. women in the *tribunaux d'arrondissement*, and in France 6·6 per cent. of the men, and 9 per cent. of the women.

Making a comparison of the crimes which are almost identical

in the two countries, France and Russia, the following table shows the proportion of acquittals by a jury :—

Russia.		France.	
Offences.	Acquittals per Cent.	Offences.	Acquittals per Cent.
Forgery (*Faux Divers*)	57	Wounding and assaulting	45
Destruction of property (incendiarism)	50	Forgery (*Faux Divers*)	39
		Breach of trust.....	39
Swindling and breach of trust	50	Destruction of property	37
Offences against morality.....	48	Uttering false coin	34
Wounding and assaulting	45	Offences against morality	33
Uttering false coin	39	Homicide	31
Robbery with violence	38	Robbery without violence	19
Homicide	34	„ with „	14
Robbery without violence.....	27	Sacrilegious robbery.....	9
Sacrilegious robbery	26		

The causes producing the proportion of acquittals in the various offences are thus almost the same in the two countries; habitual criminals have much less chance of being acquitted either by a jury or a magistrate than first offenders. Recidivism is most frequent among the various forms of theft and robbery, while, further, these offences are generally not very complicated, proofs being readily obtainable. But forgery and breach of trust are very different; here the offenders are generally educated persons, who can make a good defence, and thus are the more likely to obtain an acquittal. The same analogy can be showed, though to a smaller extent, in the acquittals of courts without a jury, as, taking the same quinquennial period 1889-93, the following table shows :—

Russia. Tribunaux d'arrondissement without a Jury.		France. Tribunaux correctionels.	
Offences.	Acquittals per Cent.	Offences.	Acquittals per Cent.
Libel	54·5	Libel	30·8
Wounding and assaulting	49·5	Perjury	23·4
Destruction of property.....	38·1	Manslaughter	16·2
Swindling, breach of trust	37·6	Swindling, breach of trust.....	10·4
Perjury	37·0	Offences against morality	7·0
Homicide	25·0	Wounding and assaulting	6·3
Rebellion and assaults on officials	16·0	Destruction of property	6·2
		Theft	5·7
Theft	13·7	Vagrancy and Begging.....	2·4
Vagrancy and Begging	6·0	Rebellion and assaults on officials	2·3

The greatest proportion of acquittals by a jury are reported from Southern Russia. But, as regards acquittals in decisions by magistrates without a jury, the most indulgent districts are those in the west, although the juries in these same districts are severe; so much so, that in 11 courts (*tribunaux*) in the west and north-west of Russia in Europe, the magistrates acquit more often than the jury.

A series of suggestions for an international organisation of civil judicial statistics were indicated by Mr. Macdonell to the Institute. Referring to what had already been done to secure some degree of uniformity in international criminal statistics, he urged that civil judicial statistics should be classified on somewhat the same basis in the various countries. The adoption of the proposals which he submitted would imply the accomplishment of the undertaking initiated by M. Yvernès in his book, "L'Administration de la justice Civile en Europe;" but the situation had completely changed since M. Yvernès made his investigations. In England, for example, the procedure had been very much modified by the "Judicature Acts," which had been adopted, not only in many of the British colonies, but also in several of the United States of America. The Institute should now go further, and endeavour to discover and define the principles, and elucidate the methods which, subject to certain local or national circumstances, might be universally applied.

He wished to call attention to the following points as being especially important:—

1. An enumeration of all existing tribunals, with information as to their functions and scope. What greatly lessens the value of some judicial statistics is that they contain no information as to special or extra-judicial tribunals, which in some countries take the place of the ordinary courts of law. In England, for example, special kinds of dispute are more and more referred to private or public arbitration or to administrative bodies. The Charity Commissioners, the Board of Trade, and the Railway Commission now decide questions which were formerly submitted to the ordinary courts of the country. It was remarkable that when the Workmen's Compensation Bill was being drawn up, it was stipulated that the amount of the indemnity recoverable by the injured workman should not be assessed by judge or jury, but rather by arbitrators.

2. An explanation as to how far criminal and civil rights are administered, together with a list showing by what tribunals or procedure punishment is awarded in the interest of the public, at the same time that private rights are determined.

3. To come to some general agreement on matters which ought

to be entered in the criminal or civil statistics. With regard to this subject there is great variety of procedure. Matters enumerated in the judicial statistics of one country are not mentioned at all in those of another. For example, figures of guardianship, tutelage, and legitimisation, trusts and mortgages, are included in some statistics, while in others there is absolutely nothing except contentious matters.

4. An agreement as to what constitutes one cause in litigation. The official publications of some countries show how many suits have been begun; but what advantage can there be in a comparison of this sort if the unit is not first agreed on?

5. A classification of the subject and nature of the suits (*procés*). In some judicial statistics, in those of Scotland for example, there is no information as to the nature of the suit. Some other judicial statistics only enumerate two kinds of law suits. In France the suits are divided according to the articles of the codes on which the cases are supported. In England a classification is employed which has some historical value, but which is not suited to universal use. The adoption of a universal classification of suits would certainly be difficult, but ought not, in Mr. Macdonell's opinion, to be impossible, with the help of the International Institute.

He concluded by suggesting that a committee should be appointed by the Institute to consider the matters referred to in his paper, and to construct, if possible, a system of judicial statistics which, subject to slight modifications as required by local circumstances, might be applied to all the countries of Europe. This was agreed to.

Divorce Statistics.

In a report presented by M. Yvernès, the results of the inquiries made on the subject of international statistics of divorces and judicial separations were submitted to the Institute. He had had the aid of eighteen out of twenty-two correspondents, but the data thus collected from sixteen countries showed regrettable deficiencies of information, statistics of this class being altogether absent in some countries. As M. Yvernès had summarised some of the leading figures of his report in the form of a comparative table, I have thought it well to reproduce this in the Appendix (p. 777), as illustrating one of the attempts made by the Institute to secure comparable data, and as exhibiting, in the necessary blanks in many columns, the extent to which complete particulars are wanting.

From a note appended to M. Yvernès' summary it appeared

that the proportion of divorces per 1,000 marriages in the different countries compared as follows:—

Country	Period.	Divorces per 1,000 Marriages.	Country.	Period.	Divorces per 1,000 Marriages.
German empire	1889–93	17·0	Prussia	1891–95	18·0§
England and Wales	'90–94	1·6	Roumania	'87–91	20·0
Austria	'90–94	4·8*	Russia—		
Bavaria	'90–94	14·0†	Orthodox church	'82–86	1·7
Belgium	'91–95	11·0	Roman Catholic	'82–86	0·2
Denmark	'75–84	13·0	Protestant	'82–86	6·7
France	'90–94	21·0	Sweden	'90–94	10·6
Italy	'90–94	2·8‡	Switzerland	'91–95	40·0
Netherlands	'91–95	12·0	Würtemberg	'91–95	10·0

* Divorces and judicial separations. † Divorce petitions.
‡ Judicial separations. § Divorce cases settled judicially.

The data in M. Yvernès' summary table show that divorces were granted in the countries named in a proportion of from 60 to 92 per cent. of the petitions presented. Speaking generally, the figures indicated that the wife, in countries where she had the choice, preferred a judicial separation to a divorce. The existence of children and the duration of the marriage at the time of divorce differed greatly. The greatest number of divorces were found in the class of artisans and persons engaged in commerce. Lastly, personal violence was the cause most frequently accounted for.

The Committee were not however satisfied with the results obtained, and recommended the adoption by the Institute of a resolution that each country should record:—

1. The number of petitions presented, and their results.
2. The persons (husband, wife, or both) presenting the petition.
3. The existence of children of the marriage.
4. The profession of the husband.
5. The duration of the marriage.
6. The motives inducing the petition.

In those countries in which a judicial separation can be changed into a divorce, the Committee were of opinion that it was of the greatest importance that the number of cases in which this conversion had been effected should be returned.

The recommendations were adopted.

Commercial Statistics.

Although the discussion of commercial and trade statistics from an international point of view did not bulk so largely on the St. Petersburg programme as the three branches of statistical

inquiry with which I have dealt, perhaps one of the most permanently useful reports laid before the Institute was that in which Mr. A. E. Bateman, as reporter of the Commerical Committee, explained in a concise and categorical form the principal differences which still exist in the modes of recording, valuing, grouping and classifying the imports and exports of various States.

In one of the tables, which I have reproduced in the Appendix (Table VII), Mr. Bateman, it will be seen, gave for eighteen countries the distinctions which mark the attempts made to record the country of origin of the imports, and the country of ultimate destination of the exports, in such countries as make any endeavour to show more than the country of immediate import and export. In another table (VIII) the methods of determining values are dealt with—the authority for the description being in each case quoted. These statements are, apart from their immediate use in keeping before the Institute the divergencies of existing methods, valuable in themselves for reference on many questions.

So too are the further statistics offering comparisons, so far as they can be made, between the categories or classes employed in the export and import returns of seven countries where the groups are uniform for both series of figures—together with separate statements for countries, like the United States of America and the United Kingdom itself, where the classes are more numerous, and where one form of classification is employed for the imports, and a different one for the exports.

Attention was drawn by M. Issakow, to a volume of statistics relating to the pension funds of employés on Russian railways. Another paper related to the railways and railway traffic of Russia generally. This was laid before the Institute by General Barkovsky, with cartograms which had already been brought under notice at the Berne meeting of the Institute.

M. Bodio recalled the attention of the Institute, as the legitimate heir of the old Statistical Congress, to the endeavours made by that body to prepare comparative formularies for the presentation of railway statistics. In the publication of these suggestions the Institute might expect the aid of the railway companies themselves. He proposed that the Institute should keep the question before them, and that the Bureau of the Institute should be charged to see whether anything could be done to give effect to the recommendations of the old committee; and this course was agreed to, after M. von Inama Sternegg had intimated a doubt whether any practical conditions could be arrived at for the moment.

M. Timiriasew offered a note bearing on the effect of low prices on the general course of international commerce. His conclusions raised a short discussion, which incidentally touched on points which have been subjects of controversy among economists of late in connection with bimetallism. The figures he submitted, with a diagram, were based on the aggregate in value of the imports and exports of all the countries shown in the review of the world's trade, for which Neumann-Spallart, and latterly, Juraschek are responsible. The series for 1860-72 were not complete, but showed a rate of increase which the later series of totals from 1873-94 did not exhibit, the last period exhibiting considerable fluctuations and a general advance at the rate of only 1 per cent. per annum, or no more than that of population. This he regarded as practical stagnation, although he pointed out that the alteration in prices, and particularly in those of agricultural products, affected countries very differently, according to the nature of their foreign trade, England gaining largely on balance in her imports, and Russia, whose exports were so largely agricultural, losing heavily. M. Timiriasew attributed the fall to the appreciation of gold, while Professor Lexis and M. Juglar urged that he had left out of view other factors of greater importance. The subject was not, however, pursued, it being agreed that controversy on the causes of lower prices was outside of the matters immediately before the Institute.

Labour Statistics.

Mr. Mayo Smith communicated to the meeting of the Institute a memorandum presented by Mr. Carroll D. Wright of the United States on behalf of the Committee on Labour. He expressed his concurrence in the action of the Committee at Berne in not adopting M. Denis's suggestion for the establishment of a special international bureau of statistics of labour. Despite the advantages such a scheme suggested in the direction of good and uniform information, he held there were difficulties important enough to prevent the institution of such a bureau. Existing labour bureaux dated from different periods; many had already made costly inquiries, and they could not be expected to repeat them; the different characters of the industries of different States were an obstacle to harmonious work, and each country must devote its energies to the things which interested it individually. He doubted if the means of fully equipping an international bureau with a proper force of experts, &c., could be faced, and if it were to be a mere office for compiling statistics already existing, so much could be secured by the existing Institute. Mr. Carroll Wright desired however again to draw attention to the proposals of Dr. Böhmert at Vienna in

1891, for the collection of international statistics of wages, which he highly approved, offering the suggestion that tables of wages should be so drawn up as to show not merely the general average but the number and percentage of persons, both male and female, earning wages of different amounts, alike for particular industries and for the country as a whole. Such tables would show the concentration of numbers at a given range.

Anthropometrical Statistics.

Dr. R. Livi, Chief of the Bureau of Health Statistics in the Italian Ministry of War, drew attention to an anthropometrical inquiry conducted from 1880-85.

The Italian soldiers were measured as to height, weight, and thoracic measurement, with other details, their occupations being at the same time noted. As a result of combining these measurements with the occupations of 300,000 soldiers, he found that the group of students show the greatest height, being 22 millimetres above the average, but their chest measurement was 13 mm. below the average. The group of peasants proved below the average height, but of more than average chest measurement. He concludes that abundant nourishment is conducive to height, but a sedentary life and confined space lead to low chest development. Exercise without air is not so favourable, as blacksmiths show a smaller thoracic perimeter than peasants. The most favoured group appeared by these statistics to be that of waggoners.

Methods of Typological Inquiry.

M. Kiær submitted a series of proposals for typological studies, He contended that in addition to general statistics, which could alone ensure exactitude in the fundamental outlines of demography, there was, especially as regards social questions, a large field allowing of partial investigations. He regarded it, however, as important that each partial investigation, whether monograph or statistical "exploration," should be connected with the general statistics, so as to be controlled by the latter on many points.

Partial investigations of the nature proposed should be as representative as possible, and the published results must include a complete explanation of the method followed to ensure as exact a representation as possible.

He proposed, therefore, that the International Statistical Institute, while reserving its opinion as to the limits of the application of partial investigation, should refer the question as to the best representative typological methods to a special committee. The suggestion for a special committee was approved.

Savings Banks Deposits.

M. Rasp presented a report on behalf of a committee appointed to investigate international statistics of savings banks with reference to the classification of deposits according to the occupation of depositors. After quoting certain figures from Belgium, England, Würtemberg, Baden, and Bavaria, details were given for a population of 1,250,000 in Bavaria. The deposits were there divided into three classes:—

1. Actual deposits of persons engaged in industry.

2. Deposits of those not engaged in industry (almost entirely children).

3. Deposits of sums held in trust for certain objects.

Of the first class 65 per cent. belonged to the working classes, and 48 per cent were held by women. In the second class, which includes 30 per cent. of the total deposits, the percentage in the hands of working people was naturally less. Grouping the first two classes together the following percentages were quoted:—

Depositors.	Per Cent. of Depositors.	Per Cent. of Total Sum Deposited.
"Unternehmer"	32·8	33·6
Administration officials.....	3·9	4·9
Artisans, workmen, and domestic servants	53·9	50·6
Persons without specified occupation	5·8	5·8
,, following the legal profession	3·6	5·1

On the whole there is little difference between the amounts deposited by the individual working people and the classes above them. As to the amount of the deposits the following figures were obtained, also from Bavaria:—

Amounts.	Per Cent. of Total Sum Deposited.	Per Cent. of Total Sum Deposited by	
		"Unternehmer."	Working People.
0— 5 marks	3·7	5·7	6·3
5— 10 ,, ...	6·1	7·9	8·2
10— 50 ,, ...	31·2	30·7	35·5
50— 100 ,, ...	21·7	18·0	21·1
100— 500 ,, ...	29·1	28·0	23·7
500—1,000 ,, ...	6·1	6·9	4·0
Over 1,000 ,, ...	2·1	2·8	1·2

M. Rasp finally urged that such statistics as he had given ought to be obtainable internationally.

Valuation of Personal Property.

I have kept to the last any mention of the very elaborate and remarkable report made by M. Neymarck, on behalf of the Committee appointed at Berne, to examine the best methods of obtaining a valuation of invested capital and of the income derived from personalty national and international. This report, which contains the exhaustive replies made and estimates tendered from Germany, England, Austria, Belgium, Denmark, Italy, Norway, Holland, and Roumania, as well as M. Neymarck's own conclusions on the portion of the inquiry thus far conducted, covers so large and important a field, that no review or condensation of the results can be attempted in this paper. The investigation would provide matter of importance for a paper in itself. Many of the estimates deduced from the values of stocks current on the Stock Exchanges of the different States, are of course matters open to some difference of view, but the names and authority of M. Neymarck's coadjutors entitle the communication to very careful study by the statisticians of all the countries concerned. Perhaps our much esteemed colleague Mr. Hendriks, who has taken an able part in this inquiry, as member both of the Committee of the Institute and of the section in which it was debated, can supplement my inability to offer any abstract of the provisional results at which M. Neymarck has arrived. The inquiry, it must be added, is intended to be further continued by the Committee, who received from the Institute additional powers with this object.

Conclusion.

In recapitulating thus a considerable number of the communications coming before the International Institute, it will be seen they necessarily take three different forms. Perhaps I ought rather to group them in four categories, if we are to reckon as a separate class the more or less ceremonial addresses by the occupants of the chair, and the official representatives of the government acting as the hosts of the gathering. With these, too, may be classed the formal communication to the Institute of published works of statistical importance.

The three forms of ordinary communications are, however:—

(1.) Those embodying the conclusions of a committee or the opinions of an individual member as regards existing statistical methods, or making proposals for new researches, or for improving the international comparability of returns.

(2.) Those which offer for consideration or amendment actual figures supplying more or less complete comparisons from existing

data; and showing by tabular demonstration where the gaps or variation of classification now occur.

(3.) Papers which supply details for a single country, among which the most useful are those which provide direct and original information respecting some specific features of the country in which the meeting is held. In this group the St. Petersburg Congress was comparatively rich.

All forms of communication are of value, but it would be of much advantage were it possible to have papers of the two former classes in future printed and circulated some months in advance of the meeting, so that their details might be duly studied by members before they were called upon at the Congress to come to definite conclusions.

APPENDIX.

Table	I.	Wheat Average, 1867-96 (Major Craigie).
„	II.	Number of Cattle „ „
„	III.	„ Sheep „ „
„	IV.	Russian Harvests and Population (M. Pokrovsky).
„	V.	Russian Census of 1897 (M. Troïnitsky).
„	VI.	Divorce Statistics (M. Yvernés).
„	VII.	Imports and Exports—origin and destination (Mr. Bateman).
„	VIII.	Imports and Exports—mode of valuing (Mr. Bateman).
„	IX.	Imports and Exports — classifications adopted (Mr. Bateman).

APPENDIX.—TABLE I. *Statement showing the Area of Land under Wheat in the undermentioned Countries for such Years as can be given from* 1867 *to* 1896.

MILLIONS OF ACRES.—NOTE: 1 acre = ·405 hectare = ·37 dessiatine.

Year.	United Kingdom.	Australasia.	Canada.	Austria.	Hungary.	France.	German Empire.	Italy.	Roumania.	Russia in Europe.[a]	Belgium.	Denmark.	Holland.	Norway.	Sweden.	United States.	Argentina.	Japan.	Algeria.	India.
1867....	3·6	1·1	—	—	—	17·9[e]	—	—	—	—	0·70[f]	0·10[f]	0·20[g]	—	0·1[g]	12·3[g]	—	—	—	—
'68....	4·0	1·1	—	—	—	17·5	—	—	—	—	—	—	0·21[g]	—	—	—	—	—	—	—
'69....	4·0	1·2	—	—	—	17·4	—	—	—	—	—	—	0·22[g]	—	—	19·2[g]	—	—	—	—
'70....	3·8	1·2	—	2·4	—	—	—	—	—	—	—	—	0·21	0·01	—	—	—	—	—	—
'71....	3·8	1·4	1·6	2·3	—	—	—	—	—	—	—	0·14	0·14	—	—	19·9	—	—	—	—
'72....	3·8	1·5	—	—	5·0	17·1	—	—	—	28·7	—	—	0·21	—	—	20·9	—	—	—	—
'73....	3·7	1·5	—	—	—	17·2	—	—	—	—	—	—	0·21	—	—	22·2	—	—	—	—
'74....	3·8	1·5	—	2·4	—	17·2	—	11·6	—	—	—	—	0·23	—	—	25·0	—	—	—	—
'75....	3·5	1·5	—	2·4	—	17·2	—	—	—	—	—	—	0·24	0·01	—	26·4	—	—	—	—
'76....	3·1	1·8	—	2·4	6·4	17·0	—	—	—	—	—	0·15	0·21	—	—	27·6	—	—	—	—
'77....	3·3	2·2	—	2·3	6·0	17·2	—	—	—	—	—	—	0·22	—	—	26·3	—	—	—	—
'78....	3·4	2·6	—	2·5	6·2	17·2	4·5	—	—	—	—	—	0·23	—	—	32·1	—	—	—	—
'79....	3·1	2·8	—	2·4	6·1	17·1	4·5	—	—	—	—	—	0·23	—	—	35·4	—	—	—	—
'80....	3·1	3·4	—	2·5	6·0	17·0	4·5	—	—	—	0·68	—	0·23	—	—	38·0	—	—	—	—
'81....	3·0	3·4	2·0[b]	2·5	6·3	17·2	4·5	—	—	28·9	—	0·14	0·22	—	—	37·7	—	—	—	—
'82....	3·2	3·4	—	2·5	6·2	17·2	4·5	—	—	—	—	—	0·23	—	—	37·1	—	—	—	—
'83....	2·7	3·7	1·9[b]	2·6	6·4	17·0	4·7	11·7	—	—	—	—	0·21	—	—	36·5	0·60	—	—	—
'84....	2·8	3·7	1·9[b]	2·7	6·8	17·4	4·7	—	—	—	—	—	0·22	—	—	39·5	—	—	—	—
'85....	2·6	—	2·0[b]	2·9	6·8	17·2	4·7	—	—	—	—	—	0·21	—	—	34·2	—	—	—	—
'86....	2·4	—	1·8[b]	2·9	6·8	17·2	4·7	—	—	—	—	—	0·20	—	—	36·8	—	—	—	—
'87....	2·4	—	1·8[b]	2·9	7·3	17·2	4·7	—	—	—	—	—	0·21	—	—	37·6	—	—	—	—
'88....	2·7	—	—	2·9	6·8[c]	17·2	4·8	—	—	—	—	0·12	0·21	—	—	37·3	—	—	—	25·9
'89....	2·5	3·9	1·8[b]	2·7	7·2[c]	17·4	4·8	—	3·3	—	—	—	0·21	—	0·16	38·1	—	—	—	24·8
'90....	2·5	3·5	2·3[b]	2·8	7·4[c]	17·4	4·8	10·9	3·7	—	—	—	0·21	0·01	0·17	36·1	—	—	—	26·6
'91....	2·4	3·7	2·3[b]	2·7	7·9[d]	14·2	4·7	11·1	3·8	—	—	—	0·14	—	0·18	39·9	—	1·1	3·1	21·5
'92....	2·3	3·8	2·5[b]	2·8	8·1[d]	17·3	4·9	11·2	3·7	32·6	—	—	0·18	—	0·18	38·6	3·30	1·1	3·2	26·4
'93....	2·0	4·2	2·3[b]	2·8	8·6[d]	17·5	5·0	11·3	3·2	32·6	—	—	0·17	—	0·17	31·6	—	1·1	3·2	26·8
'94....	2·0	3·8	2·0[b]	2·7	8·5[d]	17·3	4·9	11·3	3·4	32·9	—	—	0·16	—	0·18	34·9	—	1·1	—	26·0
'95....	1·5	3·8	2·1[b]	2·6	—	17·3	4·8	11·3	3·6	31·9	—	—	0·15	—	—	34·0	—	—	—	21·8
'96....	1·7	3·9	2·1[b]	2·6	—	17·1	4·8	—	3·7	—	—	0·08	—	—	—	34·6	—	—	—	—

[a] Ex Poland. [b] Ontario and Manitoba. [c] Excluding Croatia and Slavonia. [d] Including Croatia and Slavonia. [e] Including spelt. [f] In 1866. [g] Estimated.

TABLE II.—*Statement showing the Number of Cattle in the undermentioned Countries for such Years as can be given from* 1867 *to* 1896.

Year.	NUMBER OF CATTLE IN MILLIONS.																		
	United Kingdom.	Australasia.	Canada.	Austria.	Hungary.	France.	German Empire.	Italy.	Roumania.	Russia in Europe.[b]	Belgium.	Denmark.	Holland.	Norway.	Sweden.	United States.	Argentina.	Japan.	Algeria.	Switzerland.
1867....	8·7	3·9	—	—	—	12·7[c]	—	3·7	—	—	1·2[c]	1·2[c]	1·4	—	1·9	12·7[d]	—	—	—	1·0[c]
'68....	9·1	3·7[e]	—	—	—	—	—	—	—	—	—	—	1·4	—	1·7	—	—	—	—	—
'69...	9·1	3·7[e]	—	7·4	5·2	—	—	—	—	—	—	—	1·4	—	1·9	25·5	—	—	—	—
'70....	9·2	4·7	—	—	5·2[f]	—	—	—	—	21·4	—	—	1·4	—	2·0	23·8	—	—	—	—
'71...	9·3	4·7	2·7	7·4	5·3	—	—	—	—	—	—	1·2	1·4	—	2·0	26·7	—	—	—	—
'72....	9·7	5·0	—	—	—	11·3	—	—	—	—	—	—	1·4	—	2·1	27·0	—	—	—	—
'73....	10·2	5·8	—	—	—	11·7	15·8	—	—	—	—	—	1·4	—	2·2	26·9	—	—	—	—
'74....	10·3	6·3	—	—	—	11·5	—	3·5	—	—	—	—	1·5	—	2·1	27·2	—	—	—	—
'75....	10·2	6·9	—	—	—	11·4	—	—	—	—	—	—	1·5	1·0	2·2	27·9	—	—	—	—
'76....	10·0	7·2	—	—	—	11·4	—	—	—	—	—	1·3	1·4	—	2·2	29·2	—	—	—	1·0
'77...	9·7	7·2	—	—	—	11·5	—	—	—	27·3	—	—	1·4	—	2·2	30·5	—	—	—	—
'78....	9·8	7·4	—	—	—	11·8	—	—	—	—	—	—	1·5	—	2·2	33·2	—	—	—	—
'79....	10·0	7·9	—	—	—	11·6	—	—	—	—	—	—	1·5	—	2·2	33·3	—	—	—	—
'80....	9·9	8·2	—	8·6	5·3	11·4	—	—	—	—	1·4	—	1·5	—	2·2	35·9	—	—	—	—
'81....	9·9	8·7	—	—	—	11·6	—	4·8	—	—	—	1·5	1·4	—	2·2	35·9	—	—	—	—
'82...	9·8	8·7	1·6[a]	—	—	11·6	—	—	—	23·8	—	—	1·4	—	2·3	41·2	—	—	—	—
'83....	10·1	8·4	1·8[a]	—	—	11·8	15·8	—	—	23·6	—	—	1·4	—	2·3	42·5	—	—	—	—
'84...	10·4	8·3	2·0[a]	—	4·9[g]	12·0	—	—	2·4	—	—	—	1·5	—	2·3	43·8	—	—	—	—
'85....	10·9	8·2	2·0[a]	—	—	13·1	—	—	—	—	—	—	1·5	—	2·4	45·5	—	—	—	—
'86....	10·9	8·2	2·1[a]	—	—	13·3	—	—	—	—	—	—	1·5	—	2·4	48·0	—	—	—	1·2
'87....	10·6	8·9	1·9[a]	—	—	13·4	—	—	—	—	—	—	1·5	—	2·3	49·2	—	—	—	—
'88....	10·3	9·1	1·9[a]	—	—	13·4	—	—	2·4	24·6	—	1·5	1·5	—	2·3	50·3	—	1·0	—	—
'89...	10·3	9·7	1·9[a]	—	—	13·5	—	—	—	—	—	—	1·5	—	2·3	52·8	—	1·0	—	—
'90....	10·8	11·0	1·9[a]	8·6	—	13·6	—	5·0	2·5	—	—	—	1·5	1·0	2·4	52·9	—	1·0	—	—
'91...	11·3	11·8	2·0[a]	—	—	13·7	—	—	—	—	—	—	1·5	—	2·4	54·1	—	1·1	1·2	—
'92....	11·5	12·3	2·0[a]	—	—	13·4	17·6	—	—	—	—	—	1·5	—	2·5	52·4	22·0	1·1	1·2	—
'93....	11·2	12·7	2·1[a]	—	—	12·2	—	—	—	—	—	1·7	1·5	—	2·5	53·1	—	1·1	1·2	—
'94....	10·8	13·3	2·1[a]	—	—	12·9	—	—	—	—	—	—	1·5	—	2·5	50·9	—	—	—	—
'95....	10·8	12·9	2·2[a]	—	5·8[g]	13·2	—	—	—	—	—	—	1·5	—	—	48·2	—	—	—	—
'96...	10·9	12·4	2·1	—	—	13·2	—	—	—	—	—	—	—	—	—	46·4	—	—	—	1·3

[a] Ontario only. [b] Excluding Poland. [c] In 1866. [d] Estimated.
[e] Excluding New Zealand. [f] Including Croatia and Slavonia. [g] Exclusive of Croatia and Slavonia.

TABLE III.—*Statement showing the Number of Sheep in the undermentioned Countries for such Years as can be given from* 1867 *to* 1896.

Year.	NUMBER OF SHEEP IN MILLIONS.																	
	United Kingdom.	Australasia.	Canada.	Austria.	Hungary.	France.	German Empire.	Italy.	Roumania.	Russia in Europe [a]	Belgium.	Denmark.	Holland.	Norway.	Sweden	United States.	Argentina.	Switzerland.	Algeria.
1867....	33·8	47·3	—	—	—	30·4[b]	—	11·0	—	—	0·6[b]	1·9[b]	1·00	—	1·6	32·8[c]	—	0·4[b]	—
'68....	35·6	41·1[d]	—	—	—	—	—	—	—	—	—	—	0·95	—	1·4	—	—	—	—
'69....	34·3	40·2[d]	—	5·0	15·1	—	—	—	—	—	—	—	0·93	—	1·5	40·9	—	—	—
'70....	32·8	51·3	—	—	15·1	—	—	—	—	45·3	—	—	0·90	—	1·6	28·5[e]	—	—	—
'71....	31·4	49·8	3·3	5·0	15·1	—	—	—	—	—	—	1·8	0·87	—	1·6	31·7	—	—	—
'72....	32·2	51·5	—	—	—	24·6	—	—	—	—	—	—	0·86	—	1·7	33·0	—	—	—
'73....	34·0	58·7	—	—	—	25·9	25·0	—	—	—	—	—	0·90	—	1·7	33·9	—	—	—
'74....	34·8	61·6	—	—	—	23·9	—	7·0	—	—	—	—	0·94	—	1·6	33·8	—	—	—
'75....	33·5	64·9	—	—	—	23·8	—	—	—	—	—	—	0·94	1·7	1·6	35·9	—	—	—
'76....	32·3	64·4	—	—	—	23·9	—	—	—	—	—	1·7	0·89	—	—	35·8	—	0·37	—
'77....	32·2	59·7	—	—	—	23·4	—	—	—	51·8	—	—	0·83	—	—	35·7	—	—	—
'78....	32·6	62·7	—	—	—	23·5	—	—	—	—	—	—	0·91	—	1·5	38·1	—	—	—
'79....	32·2	67·0	—	—	—	23·0	—	—	—	—	—	—	0·90	—	1·5	40·8	—	—	—
'80....	30·2	75·2	—	3·8	9·8[f]	22·5	—	—	—	—	0·37	—	0·85	—	1·5	43·6	—	—	—
'81....	27·9	78·1	—	—	—	22·3	—	8·6	—	—	—	1·5	0·79	—	1·4	45·0	—	—	—
'82....	27·4	80·3	1·9[g]	—	—	21·6	—	—	—	47·5	—	—	0·75	—	1·4	49·2	—	—	—
'83....	28·3	83·4	1·9[g]	—	—	21·6	19·2	—	—	46·7	—	—	0·70	—	1·4	50·6	65·0	—	—
'84....	29·4	75·6	1·9[g]	—	10·6[h]	22·1	—	—	4·7	—	—	—	0·75	—	1·4	50·3	—	—	—
'85....	30·1	82·2	1·8[g]	—	—	22·9	—	—	—	—	—	—	0·77	—	1·4	48·3	—	—	—
'86....	29·0	86·2	1·6[g]	—	—	22·6	—	—	—	—	—	—	0·80	—	1·4	44·8	—	0·34	—
'87....	29·4	97·2	1·4[i]	—	—	22·9	—	—	—	—	—	—	0·80	—	1·4	43·5	—	—	—
'88....	28·9	96·1	1·3[g]	—	—	22·6	—	—	5·0	44·5	—	1·2	0·78	—	1·3	42·6	66·7	—	—
'89....	29·5	101·3	1·3[g]	—	—	22·0	—	—	—	—	—	—	0·77	—	1·3	44·3	—	—	—
'90....	31·7	114·1	1·3[g]	3·2	—	21·7	—	6·9[c]	5·0	—	—	—	0·82	1·4	1·4	43·4	—	—	—
'91....	33·5	124·3	1·7[g]	—	—	21·7	—	—	—	—	—	—	0·81	—	1·3	44·9	—	—	8·9
'92....	33·6	121·7	1·9[g]	—	—	21·5	13·6	—	—	—	—	—	0·75	—	1·4	47·3	75·0	—	9·4
'93....	31·8	119·1	2·0[i]	—	—	20·3	—	—	—	—	—	1·2	0·69	—	1·3	45·0	—	—	9·5
'94....	30·0	121·0	2·1[i]	—	—	20·7	—	—	—	—	—	—	0·67	—	1·3	42·3	—	—	7·7
'95....	29·8	111·6	2·1[i]	—	7·5[h]	21·2	—	—	4·5	—	—	—	0·68	—	—	38·3	74·6	—	—
'96....	30·9	110·4	1·9[i]	—	—	20·0	—	—	—	—	—	—	—	—	—	36·8	—	0·27	—

[a] Except Poland. [b] In 1866. [c] Estimated. [d] Excluding New Zealand [e] Not including lambs.
[f] Including Croatia and Slavonia. [g] Ontario only. [h] Exclusive of Croatia and Slavonia. [i] Ontario and Manitoba.

TABLE IV.—*Movement of Population in the Fifty Governments of Russia in Europe, compared with Variations of the Harvest and the Prices of Grain*, 1867-96.

Years.	Inhabitants. [000's omitted.]	Difference between Births and Deaths per 100 of Population.	Relation of the Harvest to the Average over the 25 Years (1870-94).			Price of a "Poud" of		Average Price of a "Poud" of		
			Wheat.	Rye.	Oats.	Rye at the Ports.	Rye and Flour (Army Supply).	Rye.	Wheat.	Oats.
						Copecks.	Copecks.	Copecks.	Copecks.	Copecks.
1867.....	63,380,	1·43	—	—	—	64	75	—	—	—
'68.....	63,988,	0·90	—	—	—	88	100	—	—	—
'69.....	64,579,	1·12	—	—	—	99	92	—	—	—
'70.....	65,729,	1·39	114·3	117·5	136·5	74	87	—	—	—
1871.....	66,590,	1·22	91·8	107·0	85·7	71	79	—	—	—
'72.....	67,206,	0·85	77·6	102·6	119·0	71	88	—	—	—
'73.....	68,321,	1·54	93·8	114·0	101·6	79	88	—	—	—
'74.....	69,485,	1·58	118·9	125·4	103·2	75	98	—	—	—
'75.....	70,715,	1·64	65·3	91·2	81·0	73	83	—	—	—
1876.....	71,884,	1·53	67·4	91·2	109·5	76	90	—	—	—
'77.....	73,025,	1·47	110·2	107·8	103·2	80	96	—	—	—
'78.....	73,721,	0·89	85·7	106·7	111·1	76	101	—	—	—
'79.....	74,910,	1·51	73·5	93·0	104·8	86	92	—	—	—
'80.....	76,080,	1·33	69·4	83·3	98·4	99	121	—	—	—
1881.....	77,264,	1·45	106·0	90·0	108·0	129	173	—	—	—
'82.....	78,163,	1·09	96 0	90·0	102·0	122	122	—	—	—
'83.....	79,225,	1·26	95·9	92·1	115·9	104	104	—	—	—
'84.....	80,635,	1·65	114·3	114·0	98·4	—	—	70	90	60
'85.....	81,824,	1·37	75·6	114·0	76·2	—	—	53	78	55
1886.....	82,945,	1·57	67·4	106·1	109·5	—	—	39	85	40
'87.....	84,069,	1·54	112·3	116·7	117·5	—	—	41	85	38
'88.....	85,367,	1·77	117·2	110·4	102·0	—	—	52	80	42
'89.....	86,454,	1·47	69·2	78·1	83·3	—	—	62	77	46
'90.....	87,489,	1·26	80·7	98·9	95·8	—	—	56	68	47
1891.....	88,493,	1·45	65·3	66·7	68·7	—	—	127	114	68
'92.....	88,872,	0·49	94·2	88·6	74·9	—	—	60	62	51
'93.....	89,959,	1·42	134·6	107·3	120·8	—	—	60	62	51
'94.....	91,100,	1·45	125·0	129·1	120 8	—	—	42	42	35
'95.....	92,600,	1·43	107·6	111·4	110·4	—	—	43	51	36
1896.....	94,189,	1·61	101·9	106·2	110·4	—	—	43	66	48
1867-70	64,319,	1·22	—	—	—	81	89	—	—	—
'71-75	68,364,	1·38	89·7	108·0	98 1	73	87	—	—	—
'76-80	73,924,	1·35	81·2	96·4	105·4	83·4	100	—	—	—
'81-85	79,422,	1·37	97·6	100·0	100·1	—	—	—	—	—
'86-90	85,265,	1·53	89·4	102·0	101·6	—	—	48	80	43
'91-95	90,205,	1·25	105·3	100·6	99·1	—	—	72	72	52

Note.—One "poud" = 36 lbs.

TABLE V.—*Preliminary Returns of the Population of the Russian Empire, according to the Census of* $\frac{28th\ January}{9th\ February}$ 1897.

Number.	Governments and Provinces.	Population according to Census of 28th January, 1897.			Number of Females per 100 Males.	Population per Square Verst.	Area in Square Versts, excluding large Inland Waters.
		Males.	Females.	Total.			
	Governments of Russia in Europe.						
1	Arkhangel	164,700	182,860	347,560	111·0	0·5	742,050·7
2	Astrakhan	512,791	489,525	1,002,316	95·5	4·8	207,193·1
3	Bessarabia	994,185	942,218	1,936,403	94·8	49·6	39,014·9
4	Vilna	794,236	797,676	1,591,912	100·4	43·2	36,825·3
5	Vitebsk	749,051	753,844	1,502,895	100·6	39·0	38,649·5
6	Vladimir	733,221	837,509	1,570,730	114·2	36·7	42,831·8
7	Vologda	654,610	710,703	1,365,313	108·6	3·9	353,349·4
8	Volhynia	1,513,584	1,485,762	2,999,346	98·2	47·6	63,036·8
9	Voronezh	1,267,092	1,280,228	2,547,320	101·0	44·0	57,902·0
10	Viatka	1,473,778	1,608,837	3,082,615	109·2	22·8	135,019·7
11	Grodno	826,534	789,281	1,615,815	95·5	47·7	33,900·8
12	Region of the Don	1,300,342	1,275,476	2,575,818	98·1	17·9	144,586·1
13	Ekaterinoslav	1,088,560	1,024,091	2,112,651	94·1	37·9	55,705·5
14	Kazan	1,078,151	1,111,924	2,190,075	103·1	39·1	55,954·8
15	Kaluga	545,187	633,648	1,178,835	116·2	43·4	27,177·9
16	Kiev	1,774,939	1,789,494	3,564,433	100·8	79·6	44,777·9
17	Kovno	761,605	788,367	1,549,972	103·5	43·9	35,315·5
18	Kostroma	658,038	770,855	1,428,893	117·1	19·4	73,809·1
19	Courland	326,866	345,673	672,539	105·8	28·3	23,747·2
20	Kursk	1,187,233	1,207,660	2,394,893	101·7	58·7	40,821·1
21	Livonia	630,475	669,926	1,300,401	106·3	32·5	40,002·4
22	Minsk	1,077,872	1,078,471	2,156,343	100·0	26·9	80,152·3
23	Moghilev	846,758	860,855	1,707,613	101·7	40·5	42,134·6
24	Moscow	1,224,573	1,208,783	2,433,356	98·7	83·2	29,236·4
25	Nijni-Novgorod	760,840	842,194	1,603,034	110·7	35·6	45,036·7
26	Novgorod	672,695	720,236	1,392,931	107·1	13·4	104,163·4
27	Olonets	173,879	192,768	366,647	110·9	3·2	112,322·0
28	Orenburg	802,936	805,452	1,608,388	100·3	9·7	166,710·9
29	Orel	1,001,933	1,052,676	2,054,609	105·1	50·0	41,057·7
30	Penza	720,912	763,036	1,483,948	105·8	43·5	34,129·1
31	Perm	1,450,351	1,552,304	3,002,655	107·0	10·4	290,168·7
32	Podolia	1,516,277	1,514,763	3,031,040	99·9	82·1	36,921·7
33	Poltava	1,388,008	1,406,748	2,794,756	101·4	63·7	43,844·0
34	Pskov	551,626	584,954	1,136,580	106·0	29·9	37,955·7
35	Ryazan	865,454	962,083	1,827,537	111·2	49·6	36,844·7
36	Samara	1,364,480	1,397,371	2,761,851	102·4	20·2	136,713·5
37	St. Petersburg	1,123,123	981,388	2,104,511	87·4	53·9	39,203·2
38	Saratov	1,188,867	1,230,889	2,419,756	103·5	32·6	74,244·8
39	Simbirsk	750,249	800,209	1,550,458	106·7	35·6	43,491·0
40	Smolensk	742,124	808,849	1,550,973	109·0	31·5	49,212·2
41	Taurida	760,661	683,174	1,443,835	89·8	27·2	53,053·8
42	Tambov	1,330,154	1,385,111	2,715,265	104·1	46·4	58,511·0
43	Tver	826,185	986,374	1,812,559	119·4	31·9	56,837·0
44	Tula	677,214	754,108	1,431,322	111·4	52·6	27,204·4
45	Ufa	1,111,904	1,107,934	2,219,838	99·6	20·7	107,209·7
46	Kharkov	1,267,182	1,243,196	2,510,378	98·1	52·4	47,874·8
47	Kherson	1,397,480	1,331,028	2,728,508	95·3	43·9	62,213·2
48	Chernigov	1,140,409	1,181,598	2,322,007	103·6	50·4	46,042·3
49	Esthonia	203,525	210,199	413,724	103·3	23·9	17,306·3
50	Yaroslavl	460,787	612,806	1,073,593	133·0	34·4	31,230·7
	Total	46,433,636	47,755,114	94,188,750	102·8	22·2	4,242,697·3

TABLE V *Contd.—Preliminary Returns of the Population of the Russian Empire.*

Number.	Governments and Provinces.	Population according to Census of 28th January, 1897.			Number of Females per 100 Males.	Population per Square Verst.	Area in Square Versts, excluding large Inland Waters.
		Males.	Females.	Total.			
	Governments of Poland.						
51	Warsaw	983,580	948,483	1,932,063	96·4	125·8	15,359·2
52	Kalisz	418,516	427,818	846,334	102·2	85·1	9,961·3
53	Kielce	375,526	388,561	764,087	103·5	86·2	8,868·6
54	Lomza	306,502	279,279	585,781	91·1	63·2	9,265·9
55	Lublin	584,026	568,636	1,152,662	97·4	77·9	14,789·4
56	Piotrkow	700,635	706,316	1,406,951	100·8	130·7	10,563·4
57	Plock	278,610	277,209	555,819	99·5	67·1	8,287·3
58	Radom	410,069	409,712	819,781	99·9	75·0	10,854·0
59	Suwalki	305,170	299,803	604,973	98·2	55·9	10,824·3
60	Siedlce	391,245	382,894	774,139	97·9	61·5	12,580·8
	Total	4,753,879	4,688,711	9,442,590	98·6	84·6	111,554·2
	Governments and provinces of Caucasia	5,129,931	4,593,622	9,723,553	89·5	23·6	411,324·6
	Governments and provinces of Siberia	2,959,557	2,772,175	5,731,732	93·7	0·5	10,922,479·7
	Provinces of the Steppes	1,803,560	1,611,614	3,415,174	89·4	1·8	1,946,838·2
	Provinces of Turkistan and the Transcaspian Territory	2,281,340	1,893,761	4,175,101	83·0	3·9	1,069,790·0
	Totals	63,361,903	63,314,997	126,676,900	99·9	6·8	18,704,684·0
	Russian colonies in Bukhara	1,739	736	2,475	42·3	—	—
	Russian subjects in Khiva	2,212	1,725	3,937	78·0	—	—
	Total according to census of 1897	63,365,854	63,317,458	126,683,312	99·9	—	—
	Grand Duchy of Finland	1,250,426	1,277,375	2,527,801	102·2	8·8	286,051·4
	General total	64,616,280	64,594,833	129,211,113	100·0	6·8	18,990,735·4

TABLE V *Contd.—Population of the Twenty Largest Russian Towns.*

Names.	Population.			Number of Females per 100 Males.
	Males.	Females.	Total.	
St. Petersburg*	693,907	573,116	1,267,023	82·6
Moscow	560,940	427,670	988,610	76·3
Warsaw	297,893	316,859	614,752	106·4
Odessa	217,063	187,588	404,651	86·4
Lodz	153,583	161,197	314,780	105·0
Riga†	143,723	139,220	282,943	96·9
Kiev	135,970	112,780	248,750	82·9
Kharkov	90,605	80,077	170,682	88·4
Tiflis	95,647	64,215	159,862	67·1
Vilna	81,596	77,972	159,568	95·6
Tashkend	88,598	67,908	156,506	76·6
Saratov	65,257	67,859	133,116	104·1
Kazan	70,028	61,480	131,508	87·8
Ekaterinoslav	65,107	56,109	121,216	86·7
Rostov-on-Don‡	62,796	57,093	119,889	90·9
Astrakhan	58,503	54,572	113,075	93·3
Baku	67,148	45,105	112,253	67·2
Tula	60,964	50,084	111,048	82·2
Kishinev	56,866	51,640	108,506	90·8
Nijni-Novgorod	53,358	45,145	98,503	84·6

* Including suburbs.

† Including the "arrondissement patrimonial."

‡ Including Nakhichevan, the total population is 149,201.

One square verst = 0·44 square mile.

TABLE VI.—*International Statistics of Divorce and Judicial Separations.*

	Numbers per Cent. of													
	Divorces in									Judicial Separations in				
	Austria, 1890-94.	Belgium, 1891-2-95-6.[a]	England and Wales, 1890-94.	France, 1890-94.	Germany, 1889-93.	Netherlands, 1891-95.	Roumania, 1887-91.	Sweden, 1890-94.	Switzerland, 1891-95.	Austria, 1890-94.	England and Wales, 1890-94.	France, 1890-94.	Italy, 1890-94.	Switzerland, 1891-95.
I. Petitions—														
Accepted	—	84	71	86	68	—	60	—	92	—	26	76	46	—
Dismissed	—	16	8	8	32	—	12	—	8[b]	—	5	11	2	—
Abandoned	—	—	21	6		—	28	—	—	—	69	13	52	—
II. Petitions—														
By husband	3	—	62	34	—	—	29	45	23	5	4	11	17	21
„ wife	4	—	38	58	—	—	71	29	46	19	96	78	54	59
„ both	93	—	—	8	—	—	—	26	31	76	—	11	29	20
III.[c] Condition as to family—														
With children	41	—	64	56	—	47	20	66	62[d]	49	—	66	53	—
Without „	59	—	36	44	—	53	80	34	38	51	—	34	47	—
IV.[c] Occupation—														
Agriculture	5	—	—	9	—	—	61	21	25[e]	11	—	18	12	—
Manufacturing industry and transport	71	—	—	73	—	—	17	64	66	61	—	60	47	—
Rentier	3	—	—	11	—	—	2	15	5	3	—	17	22	—
Professional classes	19	—	—		—	—	20			19	—		19	—
Domestic service	2	—	—	7	—	—	—	—	4	6	—	5	—	—
V.[c] Duration of marriage—														
Less than one year	7	—	2[f]	3	—	—	11	1	3[g]	6	—	3	8	—
One to five years	38	—	22	28	—	—	68	12	33	28	—	23	27	—
Five „ ten „	29	—	31	39	—	—		29	26	27	—	36	27	—
Ten „ twenty years	21	—	35	23	—	—	21	43	27	28	—	27	27	—
Twenty years and upwards	5	—	10	7	—	—		15	11	11	—	11	11	—
VI. Cause of petitions—														
Violence	—	—	—	78	—	—	96	—	18[h]	7	—	89	22	—
Adultery of wife	—	—	—	12	—	—	2	8	12	2	—	5	7	—
„ husband	—	—	—	7	—	—	1	4		2	—	5	2	—
Conviction for crime	—	—	—	3	—	—	1	5	4	3	—	1	—	—
Desertion of husband	—	—	—	—	—	—	—	34	8	—	—	—	8	—
„ wife	—	—	—	—	—	—	—	17		—	—	—		—
Insanity	—	—	—	—	—	—	—	3	1	—	—	—	—	—
Extravagance, drunkenness, violence and incompatability of temper, and mutual consent	—	—	—	—	—	—	—	28	57	—	—	—	61	—
Other and unknown	100	—	—	—	—	—	—	1	—	86	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—

[a] Judicial year.
[b] Divorces and judicial separations.
[c] III, IV, V, cases where the condition as to family, occupation, or duration of marriage were unknown have been omitted from these calculations.
[d] 1876-80. [e] 1881-85. [f] All matrimonial cases. [g] 1876-90. [h] 1891-95.

TABLE VII.—*Method of Registering Imports and Exports by Country of Origin or Destination in the Trade Returns of certain European Countries and of the United States.*

Country.	Imports.	Exports.	Authority.
Austria	Country of origin	Country of ultimate destination	Austria. — Trade Vol. 1895, part 1, p. xxxii
Belgium	Endeavour to obtain country of origin, but information imperfect	Endeavour to obtain country of ultimate destination, but information imperfect	Belgium. — Trade Vol. 1895, p. viii
	Trade by land with Austria and Switzerland is sometimes treated as trade with Germany; and trade by land with Spain, Italy, and Switzerland is sometimes treated as trade with France.		
Bulgaria	Country whence imported *...	Country to which exported †	Bulgaria. — Trade Vol. 1895
Denmark	Country whence imported *...	Country to which exported †	Denmark. — Trade Vol. 1895
France	Country of origin	Country of ultimate destination	France.—Trade Vol. 1895, p. viii, sec. 5
Germany	Country of origin	Country of ultimate destination	Germany. — Trade Vol. 1895, part 1, p. 43
Greece	Country from which immediately imported	Country of ultimate destination	Greece.—Trade Vol. 1893, p. 9
Holland	*By sea.*—That country is considered to be the country of origin from which the vessel carrying the goods started, according to the bill of lading	*By sea.*—That country is considered to be the country of destination to which the vessel carrying the goods cleared ‡	Holland. — Trade Vol. 1895, part 1, p. xxi
	By land, river, or canal.—In the case of imports or exports by land or along rivers or canals, the frontier State is always considered as the country of origin or destination, *i.e.*, either Belgium or Germany. As, for instance, goods imported from, or exported to France by rail are, in consequence, treated in the accounts as referring to Belgium.		
Italy	Country whence imported *...	Country to which exported †	Italy. — Trade Vol. 1895, p. xiii
Norway	Country whence imported *...	Country to which exported †	Norway. — Trade Vol. 1895
Portugal	Country of origin	Country of ultimate destination	Portugal. — Trade Vol. 1894. Introduction.
Roumania	Country whence imported *...	Country to which exported †	Roumania. — Trade Vol. 1895
Russia	Country whence imported *...	Country to which exported †	Russia.—Trade Vol. 1894
	The European and Asiatic frontiers and the trade with Finland are also shown separately.		
Spain	Country from which immediately imported	Country of immediate destination	Spain.—Trade Vol. 1895, p 95.
Sweden	Country whence imported *...	Country to which exported †	Sweden. — Trade Vol. 1895
Switzerland	Country of origin	Country of ultimate destination	Switzerland.—Trade Vol. 1892, p. A 4
United States	Country whence imported ...	Country to which exported ...	United States.—Trade Vol. 1896
United Kingdom	Country whence imported ...	Country to which exported ...	—

* No explanation can be given as to whether the country of origin is meant or not.
† " " " ultimate destination is meant or not.
‡ Unless a different destination is stated when the goods are declared at the custom house.

TABLE VIII.—*Method of Valuing Imports and Exports in the Trade Returns of certain European Countries and of the United States.*

Country.	Imports.	Exports.	Authority.
Austria	Official values—revised annually by a Permanent Valuation Commission	Official values—revised annually by a Permanent Valuation Commission	Austrian Trade Vol. 1895, part 1. Introduction, sec. 8, p. xvii *et seq.*
Belgium	Declared values—where goods are shown by value; in all other cases official values—revised annually by a Valuation Commission	Declared values—where goods are shown by value; in all other cases official values—revised annually by a Valuation Commission	Belgian Trade Vol. 1895, pp. viii and xxxvii
Bulgaria	No information	No information	—
Denmark	Values based on the foreign exporters' prices, with addition of expenses of bringing the goods to Denmark	Values based on the home exporters' prices, with addition of expenses of sending the goods to their foreign market	Danish Trade Vol. 1895. Introduction, p. vii
France	Actual values—revised annually by a Permanent Valuation Commission	Actual values—revised annually by a Permanent Valuation Commission	French Trade Vol. 1895, p. ix, sec. vi
Germany	Official values—revised annually by a Valuation Commission	Official values—revised annually by a Valuation Commission	German Trade Vol. 1895. Part 1, p. 1, and part 2, p. 61
Greece	Official values—fixed in 1889 by a Special Commission	Official values—fixed in 1889 by a Special Commission	Greek Trade Vol. 1893, p. 9, and Trade Vol. 1895, p. 21
Holland	Declared values in the case of dutiable goods; but in the case of goods free of duty official values computed on a quantitative basis	Official values computed on a quantitative basis	Dutch Trade Vol. 1895, part 1, p. xxi
Italy	Official values—revised annually by a Valuation Commission, and approved by the Minister of Finance	Official value—revised annually by a Valuation Commission, and approved by the Minister of Finance	Italian Trade Vol. 1895, p. viii
Norway	Official values—revised annually	Official values—revised annually	Norwegian Statistical Abstract, 1896, p. 112. *et seq.*
Portugal	No information	No information	—
Roumania	No information	No information	—
Russia	No information	No information	—
Spain	Official values—revised annually	Official values—revised annually	Spanish Monthly Trade Accounts, June, 1897, p. 35
Sweden	Official values—decided upon after inquiries made by the Department of Commerce	Official values—decided upon after inquiries made by the Department of Commerce	Swedish Trade Vol. 1895, pp. ii and iii
Switzerland	Partly official,* partly declared values. (The former are revised annually by a Valuation Commission)	Declared values	Swiss Trade Vol. 1895, pp. A 2 and A 54 (note), and Annual Report on Swiss Trade, 1895, p. 63 *et seq.*
United States	Actual market value, or wholesale price in the principal markets of the country whence imported, including value of packages, &c., and all other expenses incident to placing the merchandise ready for shipment to the United States	1. Foreign exports— (*a.*) The exports "from warehouse" are stated at the "import" value (*b.*) Exports *not* "from warehouse" are stated at their value at the United States Port whence exported 2. Domestic exports— These are given at their market value at the time and place of shipment	United States.—Trade Vol. 1896. Vol. i, part 1, p. vii
United Kingdom	Declared values, as landed	Declared values at port of shipment	—

* The majority of the values are official values, only a small proportion being declared.

TABLE IX.—*Classification of Imports and Exports into and from the under-noted Countries, showing the per Cent. of Total Value in each Class.*

RUSSIA.

Years.	Animals, Living.		Articles of Food.		Raw and Semi-Manufactured Materials.		Manufactured Articles.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.
1884 ...	0·2	2·4	29·0	59·0	51·1	36·0	19·7	2·6
'85 ...	0·3	2·7	26·8	62·1	53·6	32·1	19·3	3·1
'86 ..	0·3	2·4	28·9	56·6	52·8	37·3	18·0	3·7
'87 ...	0·3	2·0	22·4	60·3	60·7	34·6	16·6	3·1
'88 ...	0·4	1·7	20·2	63·9	61·8	31·4	17·6	3·0
'89 ...	0·3	1·7	19·0	57·4	61·6	38·2	19·1	2·7
'90 ...	0·4	1·6	20·5	56·4	60·3	39·1	18·8	2·9
'91 ...	0·4	2·4	20·5	59·6	58·3	35·0	20·8	3·0
'92 ...	0·5	3·3	20·3	43·0	59·8	49·2	19·4	4·5
'93 ...	0·5	2·2	21·8	56·3	57·7	38·1	20·0	3·4
'94 ...	0·7	1·9	17·0	65·1	57·8	30·4	24·5	2·6

HOLLAND.

Years.	Articles of Food and Live Animals.		Raw Materials.		Manufactured Articles.		Miscellaneous Articles, not Classified.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt of total value.	Per cnt. of total value.	Per cnt. of total value.
1885 ...	33·5	36·2	42·3	34·5	23·7	25·5	0·5	3·8
'86 ...	33·1	35·1	39·5	37·8	26·3	21·7	1·1	5·4
'87 ...	34·0	37·0	39·6	30·0	25·7	26·3	0·7	6·7
'88 ...	34·4	32·8	43·9	34·6	20·5	23·1	1·2	9·5
'89 ...	34·0	33·4	45·3	35·3	19·3	22·0	1·4	9·3
'90 ...	36·4	32·5	44·4	34·4	18·2	24·7	1·0	8·4
'91 ...	34·1	34·1	44·6	36·4	20·1	21·2	1·2	8·3
'92 ...	32·4	32·6	41·4	32·6	24·3	25·0	1·9	9·8
'93 ...	34·8	37·9	42·2	38·1	19·3	22·2	3·7	1·8
'94 ...	35·8	39·5	42·6	36·9	18·6	21·8	3·0	1·8
'95 ...	37·4	39·1	41·2	36·1	19·2	21·5	2·2	3·3

ITALY.

Years.	Articles of Food.		Materials Used in Industry, Raw.		Materials Used in Industry, Half Wrought or Prepared.		Manufactured Articles.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.
1884 ...	20·9	39·0	28·7	17·7	17·1	29·2	33·3	14·1
'85 ...	27·9	33·9	26·8	18·2	14·5	31·7	30·8	15·2
'86 ...	25·9	36·2	27·8	17·2	15·7	32·4	30·6	14·2
'87 ...	25·0	40·3	28·2	15·5	14·8	30·1	32·0	14·1
'88 ...	22·7	30·8	32·9	18·5	15·6	36·7	28·8	14·0
'89 ...	26·0	28·9	32·6	18·7	15·7	36·9	25·7	15·5
'90 ...	24·2	29·1	35·6	19·6	16·0	35·5	24·2	15·8
'91 ...	—	—	—	—	—	—	—	—
'92 ...	25·4	29·7	34·8	18·9	16·8	37·7	23·0	13·7
'93 ...	24·5	30·4	36·1	20·4	16·8	33·4	22·6	15·8
'94 ...	18·2	32·7	41·8	17·5	17·9	33·1	22·1	16·7
'95 ...	20·4	29·8	38·1	16·9	20·4	35·5	21·1	17·8

INDIA.

Years.	Live Animals, Food and Drink, and Narcotics.		Raw Materials.		Manufactured Articles.		Coin and Bullion.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.
1891 ...	10·8	42·4	10·5	37·5	60·4	17·7	18·3	2·4
'92 ...	10·6	40·3	10·1	33·2	59·3	19·7	20·0	6·8
'93 ...	10·1	35·1	9·6	37·7	58·6	24·0	21·7	3·2
'94 ...	10·7	32·4	9·6	38·4	65·5	22·5	14·2	6·7

TABLE IX *Contd.—Classification of Imports and Exports.*

GERMANY.

Years.	Articles of Food and Live Animals.		Raw Materials.		Manufactured Articles.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
	% of total value.	% of total value.	% of total value.	% of total value.	% of total value.	% of total value.
1885.....	30·3	18·5	41·2	18·6	28·5	62·9
'86.....	29·3	16·3	41·3	18·6	29·4	65·1
'87.....	30·9	15·9	42·4	18·7	26·7	65·4
'88.....	27·6	15·2	45·8	20·1	26·6	64·7
'89.....	30·6	12·7	44·6	21·0	24·8	66·3
'90.....	33·5	14·2	42·9	21·3	23·6	64·5
'91.....	36·4	13·8	41·8	21·7	21·8	64·5
'92.....	37·4	12·5	41·3	21·5	21·3	66·0
'93.....	33·2	13·8	44·0	21·6	22·8	64·6
'94.....	36·5	14·0	42·3	22·6	21·2	63·4
'95.....	33·7	12·5	43·8	21·8	22·5	65·7

FRANCE.

Years.	Articles of Food.		Raw Materials.		Manufactured Articles.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
	% of total value.	% of total value.	% of total value.	% of total value.	% of total value.	% of total value.
1885.....	35·6	24·3	49·5	22·9	14·9	52·8
'86.....	36·6	22·5	49·5	23·8	13·9	53·7
'87.....	35·4	21·7	50·0	24·8	14·6	53·5
'88.....	36·7	22·4	49·2	25·0	14·1	52·6
'89.....	33·4	22·6	52·4	25·4	14·2	52·0
'90.....	32·6	22·8	52·8	23·9	14·6	53·3
'91.....	34·7	22·7	50·7	23·4	14·6	53·9
'92.....	33·4	21·9	51·9	23·8	14·7	54·3
'93.....	27·5	22·0	57·9	24·2	14·6	53·8
'94.....	31·1	21·6	54·7	24·5	14·2	53·9
'95.....	27·8	17·5	56·5	25·9	15·7	56·6
'96.....	26·5	19·2	57·2	24·6	16·3	56·2

SWITZERLAND.

Years.	Articles of Food.		Raw Materials.		Manufactured Articles.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
	% of total value.	% of total value.	% of total value.	% of total value.	% of total value.	% of total value.
1886.....	29·1	12·4	37·7	15·1	33·2	72·5
'87.....	28·9	11·5	38·6	14·6	32·5	73·9
'88.....	29·0	10·8	37·5	15·6	33·5	73·6
'89.....	29·0	10·5	38·7	13·6	32·3	75·9
'90.....	31·0	11·2	37·2	12·2	31·8	76·6
'91.....	32·6	11·9	34·6	12·0	32·8	76·1
'92.....	31·1	12·3	37·7	12·8	31·2	74·9
'93.....	29·8	12·0	40·3	12·9	29·9	75·1
'94.....	32·0	13·0	37·6	12·2	30·4	74·8
'95.....	30·3	11·8	39·0	12·3	30·7	75·9

AUSTRIA.

Years.	Articles of Food (Raw and Unprepared).		Raw Materials.		Manufactured Articles.	
	Imports.	Exports.	Imports.	Exports.	Imports.	Exports.
	% of total value.	% of total value.	% of total value.	% of total value.	% of total value.	% of total value.
1885.....	19·5	19·9	34·0	25·4	46·5	54·7
'86.....	16·4	21·4	37·3	23·9	46·4	54·7
'87.....	14·9	21·9	38·8	24·7	46·3	53·4
'88.....	14·0	23·3	38·7	25·5	47·3	51·2
'89.....	13·8	22·2	38·4	27·0	47·8	50·8
'90.....	15·5	22·8	38·8	27·4	45·7	49·8
'91.....	16·0	24·2	37·6	24·7	46·4	51·1
'92.....	14·4	23·2	37·2	25·9	48·4	50·9
'93.....	14·9	25·0	37·8	25·3	47·3	49·7
'94.....	17·4	29·5	34·3	24·9	48·3	45·6

TABLE IX *Contd.—Classification of Imports and Exports.*

UNITED STATES.

Years.	Imports (entered for Consumption).					Exports (special).					
	Articles of Food and Live Animals.	Articles in a crude condition used in Domestic Industry.	Articles wholly or partially Manufactured for use in Manufactures.	Manufactured Articles ready for Consumption.	Articles of Voluntary use, Luxuries.	Products of Agriculture.	Products of Mines, including crude Mineral Oils.	Products of the Forest.	Products of the Fisheries.	Products, Miscellaneous.	Manufactures, Domestic.
	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per ct. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.
1886.....	31·4	23·0	12·6	20·2	12·8	73·8	2·0	3·2	0·8	0·7	20·5
'87.....	30·9	24·3	11·7	19·9	13·2	74·4	1·7	3·0	0·7	0·7	19·5
'88.....	30·8	23·6	11·9	20·3	13·4	78·2	2·6	3·5	0·8	0·8	19·1
'89.....	32·5	23·2	11·4	19·9	13·0	72·9	2·7	3·7	1·0	0·7	19·0
'90.....	32·1	23·1	10·9	20·0	13·9	74·5	2·6	3·5	0·9	0·6	17·9
'91.....	34·0	21·9	12·8	17·2	13·1	73·7	2·5	3·3	0·7	0·4	19·4
'92.....	36·8	24·3	9·9	17·5	11·5	78·7	2·0	2·8	0 5	0·4	15·6
'93.....	31·9	25·9	11·2	18·2	12·8	74·0	2·4	3·4	0·7	0·5	19·0
'94.....	43·3	19·9	10·3	15·6	10·9	72·3	2·4	3·2	0·5	0·5	21·1
'95.....	31·0	25·6	11·5	19·2	12·7	69·7	2·3	3·6	0·7	0·5	23·2
'96.....	30·1	26·6	10·5	21·1	11·7	66·0	2·3	3·9	0·8	0·5	26·5

UNITED KINGDOM.

IMPORTS (General Trade).

Years.	Animals, Living, for Food.	Articles of Food and Drink, Free of Duty, and Dutiable, including Tobacco.	Raw Materials for Textile Manufactures.	Raw Materials for sundry Industries and Manufactures.	Metals.	Chemicals, Dye-Stuffs, and Tanning Substances.	Oils.	Manufactured Articles.	Miscellaneous Articles, including Parcel Post.
	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	% of total value.	Per cnt. of total value.	Per cnt. of total value.
1890.....	2·7	39·5	20·3	9·9	5·6	1·9	1·7	15·0	3·4
'91.....	2·1	41·1	20·5	9·2	5·3	1·7	1·7	14·9	3·5
'92.....	2·2	42·2	18·3	9·9	5·0	1·6	1·7	15·4	3·7
'93.....	1·6	42·6	16·8	10·1	5·1	1·6	1·8	16·3	4·1
'94.....	2·2	40·9	17·3	10·6	4·7	1·5	1·8	16·9	4·1
'95.....	2·2	40·4	17·0	10·6	4·5	1·6	1·9	18·1	3·7
'96.....	2·4	39·9	17·0	10·7	4·6	1·5	1·9	18·4	3·6

EXPORTS (Special Trade).

Years.	Animals, Living.	Articles of Food and Drink.	Raw Materials.	Yarns and Textile Fabrics.	Metals and Articles Manufactured therefrom (except Machinery).	Machinery and Millwork.	Apparel and Articles of Personal Use.	Chemicals and Chemical and Medicinal Preparations.	All other Articles either Manufactured or partly Manufactured, including Parcel Post.
	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.	Per cnt. of total value.
1890	0·3	4·3	8·2	42·7	17·2	6·2	4·3	3·4	13·4
'91.....	0·3	4·3	8·6	42·9	15·8	6·4	4·6	3·6	13·5
'92.....	0·3	4·6	8·5	44·1	14·6	6·1	4·6	3·8	13·4
'93.....	0·3	4·9	7·8	44·3	14·1	6·4	4·4	3·9	13·9
'94.....	0·3	5·0	9·2	44·5	13·0	6·6	4·0	3·9	13·5
'95.....	0·3	5·0	8·1	44·8	12·8	6·7	4·1	3·7	14·5
'96.....	0·4	4·7	7·4	43·9	14·0	7·1	4·4	3·4	14·7

Discussion *on* Major Craigie's Paper.

Mr. F. Hendriks said, in responding to Major Craigie's invitation, that he should give some account of the proceedings in Section 4, of which he was Vice-President, that it was perfectly impossible in ten minutes to go minutely into the conclusions of a Committee whose labours were comprised in a volume of some fifty or sixty pages. However he would deposit a copy of the report with the Statistical Society, so that if any member took an interest in the proceedings of that Section, they would be at his disposal. He might say, however, that they had not advanced one step in getting at any figures of personalty in the general acceptation of the term, *la fortune mobilière*, as the French called it, but had simply got at a rough estimate for different countries of the *valeurs mobilières*, which was quite a different matter. That term merely implied stock exchange negotiable securities of various countries. These results could not be accepted as more than a rough approximation; still, for a comparison of different countries *inter se* they had their value, and it was probable that some of the suggestions of his colleagues on the occasion of the St. Petersburg meeting would be found extremely interesting. He believed the report was intended also to appear, as indeed a notice of it had already appeared, in the *Journal* of the Statistical Society of Paris, of which M. Neymarck was a former President. By M. Neymarck's able initiative and untiring perseverance the inquiry on personal property by the International Statistical Institute was in point of fact set on foot. In conclusion he wished to bear testimony to the admirable manner in which Major Craigie had carried out the very difficult task of putting into reasonable compass the exhaustive discussions of statistical work in St. Petersburg.

Mr. A. E. Bateman agreed with Mr. Hendriks that Major Craigie had done his work admirably. The only point he need allude to was his own particular branch, in which he acted as *rapporteur* in connection with international statistics of trade. There was no subject on which people were more fond of dogmatising than on trade statistics, and talking about the trade of one country going down and another going up, of one country having the balance of trade and the other not. But really great caution was required in comparing the trade accounts of different countries, as would be seen by turning to Tables VII, VIII, and IX in the Appendix, and observing what great divergence of method there was in preparing the returns. Some returns specified the country of origin of the imports, others only the place whence the goods were imported. In the latter case there might be a great difference from one particular line of steamers making a change in the port from which they started. Similarly, as regards the exports, some countries registered the ultimate destination of the goods, while others took the port of immediate destination. Then there were other difficulties, such as the method of valuing, which was different in most countries. Our own method in England

appeared to be the best, as it took into account the market value at the moment as declared by the importer and exporter. Other countries as a rule had official values which were revised every year, or sometimes once in three years, so that the monthly accounts of those countries never showed what the actual value of the goods coming and going was, but the values of a year or two before. A third point was that of classification. In Table IX he had taken out the different categories under which the chief countries classified their articles of import and export, and anybody who was studying the situation of a country would find this table of some value. When changes were found in these categories, say, for instance, in manufactured articles, and that, as in the case of Germany, Italy, Switzerland, and other countries, the exports of manufactures were increasing, while those of food were decreasing in percentage, a good idea might be obtained of their industrial activity and their competition with England. In the same way with raw materials and articles of food. The categories did not all agree between different countries, but they remained the same from year to year, so that the percentages would not be affected. It was desirable to draw attention to these points at the present time, when there were so many controversies about trade.

He thought they deserved credit at St. Petersburg for sticking to the business of the Institute, which was to try and make more comparable the statistics of different countries, and to show each other what they were doing. One small point which Major Craigie had just alluded to was the number of ladies found in the census offices. He made further inquiries, and found that there had recently been an interesting economical and social development in Russia. Owing to the recent fall in price of corn, many landed proprietors and others who had houses in St. Petersburg were glad that their daughters should earn something towards the cost of their clothing and keeping up their proper position. They had therefore procured their daughters admission to government offices as clerks, for which they received about a rouble a day, equal to *2s.* 1½*d.* These ladies were not the daughters of small shopkeepers, but as a rule the daughters of the minor *noblesse* in Russia, and were found in large numbers in all the offices. The accounts he had of them were very favourable. Four or five of these ladies were attached to the International Institute's bureau during the recent congress, and were a great help in making French translations, typewriting, &c. He had received great assistance from them which he should like to acknowledge there as he had done on the spot. Some of them seemed to have a great aptitude for statistics, which gave him the idea that if they could persuade more ladies to join the Society and read papers, it would be much to the Society's advantage.

Sir Rawson W. Rawson said that before making any remarks on the paper he believed he had, through the lamented death of one of their oldest members, the late Mr. James Heywood, F.R.S., become the *doyen* and certainly the oldest member connected with

the direction of the Royal Statistical Society, and therefore he might be entitled to speak in the name of the Society, and say with what pleasure they saw Mr. Courtney in the Chair, and express the confidence which he felt they would have in him during his term of office as a most active, zealous and sympathetic supporter of their labours.

The paper, he thought, was hardly one for general discussion, but he should be disloyal to the Institute which had done him the honour to name him as its President, and to repeat that nomination now for six biennial terms, if he did not thank Major Craigie for his very valuable *résumé* of the proceedings at St. Petersburg, in which he had unhappily been unable to take any part himself through illness. The Statistical Society, as the parent of the Institute, must feel some interest in what had been done, and in finding how far its offspring had walked in the ways and profited by the example of the parent Society. The Statistical Society had of course taken up as its principal field of labour their own kingdom; the Institute had a very much larger field, dealing with the statistics of every nation, and therefore had been naturally obliged to step slowly and warily in the endeavour to conciliate and bring together the representatives of the different civilised countries, and to mould their statistics in such a manner as to render them comparable. At the commencement there had been a good deal of jealousy and fear of intrusion, but though they might not have marched at a pace which might gratify the expectation of ardent statisticians, they had at least not been idle. They had attacked a number of important subjects, and had reconciled the representatives of other governments, who were sometimes very difficult to please, to the consideration of these subjects in a body constituted like the Institute. He did not say there were no jealousies still existing, but they had to a great extent been reconciled, and the members were all working most cordially together. He agreed with Major Craigie that they had perhaps attempted too much. The short time they were together prevented their discussing as fully as was desirable many of the subjects brought forward, but it was their object to elicit the views of the very competent and distinguished men who attended the meetings, amongst whom were most of the directors of the Statistical *Bureaux* of the governments of Europe. Major Craigie had given a very full and impartial account of the proceedings, but, of course, as he could not be omnipresent, he might not have been able to do equal justice to all the papers, or might even have overlooked some details, but he (Sir Rawson) could vouch for it, he had been impartial, and both this Society and the International Statistical Institute were much indebted to him. Further information might be obtained on any of the subjects treated at this meeting in the *Bulletin* of the Institute, which was published annually.

Mr. John Macdonell desired to point out the very great value of some of the contributions laid before the St. Petersburg meetings with regard to subjects which he happened to have studied, and in particular international criminal statistics. That

question had passed through three stages. First, the stage of youth and faith, in which statisticians believed it was perfectly easy to establish comparisons between the criminal statistics of any two countries. There was the second stage, which he might call the stage of despair, in which statisticians, looking more closely into the difficulties of the subject, came to the conclusion that such comparisons were deceptive and useless: that a crime which was designated by a particular name in France for example, did not turn out on closer examination to have its exact equivalent in any crime known to the English law; and that facts which had been compared had little in common. A third stage had now been reached, the stage of moderate expectations, and he believed the papers that had been referred to by M. Tarnovsky and M. Bodio were examples of this stage. Excellent though those papers were, he noticed, on the hasty inspection which he had made of them, some slight slips. At p. 758 there was a very interesting comparison between the acquittals in Russia and in France, and there was a table at the bottom of p. 760 in which the subject of libel was dealt with. It appeared there that acquittals in Russia in cases of libel amounted to 54 per cent., whilst in France in the years 1889-93 they were 30 per cent. Now he happened to look at some figures dealing with a slightly earlier period in France, 1881-85, and he found that the figures for that period were almost exactly the same as those given for Russia, namely, 52 per cent. Taking another period in France, the figures were 51 per cent. That showed how careful one must be not to lay too much stress on figures which related only to short periods. Again, on p. 777, there was an extremely interesting table with reference to divorce and judicial separation in the chief countries of Europe. That table, read subject to all proper limitations, so far as he knew, was correct, but he feared it was not always read with the proper qualifications and reservations. Some of the figures related to divorce only, some to judicial separation only, and some to both. With regard to England and Wales, there was one important omission which was passed over in almost all statistical inquiries with regard to this subject. The figures printed in this table were those relating to divorce and judicial separations decreed in the divorce court. But it was well known that magistrates had, under certain circumstances, powers, which had been fortified by a recent Act, to make orders which had virtually the same effect as decrees for judicial separation. This was rather an important qualification, because, if it were lost sight of, England and Wales would be near the bottom of the list, while, adding that information, it might not be far from the top. Another qualification also occurred to him in looking at another interesting paper, that of M. Tarnovsky—The writer spoke generally of acquittals in Russia. He was not sufficiently familiar with the state of things in Russia to speak with confidence on that point, but if Russia were in that respect at all like England and Wales, figures given for the whole of that vast empire would not be very instructive. The percentages of acquittals varied in the most astonishing manner throughout England and Wales. The highest percentage was to be found in

the Welsh counties, where, roughly speaking, it was 50 per cent., while it fell to something like 20 or 25 per cent. in other counties. A very important consideration in that respect was the nature of the offence. In the case of certain crimes, such as burglary, there were nearly 90 per cent., whereas in other cases its percentage did not amount to more than 30. These studies were of great value, and he was confident that the more they were carried out the more clearly one important conclusion would be brought out, namely, that all statistical phenomena, moral and commercial, were closely connected, and that just as the physicist could find a sort of likeness in the fauna, flora, and geology of a district, so the student of moral statistics must come to the conclusion that there was a close relationship between all the phenomena which he studied.

Mr. R. H. Hooker remarked that the author had reproduced one table which seemed to require qualification. Dr. Bertillon's table on p. 753, showed that the birth-rate per 1,000 women aged 15—50 was about three times as great in the poor quarters of large cities as in the rich. But this was no guide to the comparative birth-rates of rich and poor, for in the rich districts there was a very large number of domestic servants who were precisely of the ages considered, and nearly all of whom were necessarily unmarried. To estimate in some degree the effect of these he (Mr. Hooker) had worked out the birth-rate per 1,000 married women aged 15—45, and he found that, comparing Hampstead with Whitechapel (taken as instances of a rich and a poor district), while Dr. Bertillon's method gave birth-rates of 61 and 178 respectively—practically as given in the paper—the rate per 1,000 married was 225 and 338; *i.e.*, an excess of over 200 per cent. was at once reduced to 50 per cent only, so that three-quarters of Dr. Bertillon's excess was knocked off by this consideration alone. The number of domestic servants for each London district was not given in the census, but in the quarter termed "west" it appeared that no less than 23·6 per cent. of all the occupied women were domestic servants, a number which would evidently completely disturb the marriage-rate.

Mr. J. A. Baines said that considering the lateness of the hour, he would reserve any remarks he had to make with regard to the Russian Census, 1897, and the proposed Universal Census of 1900 for a future number of the *Journal*.

The Right Hon. Leonard H. Courtney (President) said that he had to offer his sincere thanks to Sir Rawson Rawson for the way in which he had spoken of himself. He was afraid he should prove a very inefficient President, owing to circumstances over which he had not entire control, but what he could do he should try to do. With respect to the paper read by Major Craigie, it would be manifestly impossible in the course of half an hour to master all the multifarious topics which were dealt with. He could not express too highly the value of the work to which the International Institute devoted itself. It was quite possible, as

had been said by Mr. Macdonell, that their labours were not yet perfect; probably it would be a long time before they approached any degree of perfection, but they might establish what might be called the same vocabulary, the same point of observation, the same dates of departure, and the same method of compilation. If this could be realised in any degree amongst the civilised nations of the world, a great advance would be made towards arriving at really exact statistics, not merely of particular kingdoms, but for comparison between different nations. The question of population was one which ought to be one of the simplest matters, but it was not so. The same methods of enumeration, division, and classification not being followed by various nations, there was considerable difficulty in getting the same data fixed upon. He did not think himself that, if the period of observation was sufficiently short and the censuses sufficiently numerous, it was of the utmost importance that they should get the same date. He despaired entirely of nations agreeing to make all their enumerations on one day. It would not be easy for England to depart from the periods for which they had so many decennial censuses, as they would then lose the advantage of comparison, so that they were almost bound to adhere to the period which had been adopted beginning in 1801. They might, he hoped, at no distant date obtain intermediate censuses, and if other nations did the same, they would get a pretty fair comparison as to the movement of numbers between nations, even although they had different dates of departure. They might also fairly hope in time to get something like the same method of classification. Sex, of course, was extremely easy, but the classification of occupations was a matter in which no great advance to exactness had been made even amongst ourselves, and therefore we could not expect to find other nations at once ready to join with us in any particular line. He noticed that Major Craigie omitted any reference to the United States, but on the question of time, no doubt they would find much the same difficulty as ourselves, although as their censuses were coincident with the years 1860, 1870, 1880, and so on, there would be no change of year, but the date would be different from that suggested for an international census. He confessed he thought Mr. Bateman was a little sanguine in expecting to get pretty exact valuations in commercial matters in respect of trade. No doubt justifiably, he said we had the best method, although that was only introduced within recent times, namely, that of taking the declared values of the exports and imports as the basis of calculation. That was pretty easy, and in this country pretty trustworthy. But in dealing with a nation or colony that had import duties *ad valorem*, he thought there would be considerable hesitation in taking the value on importation declared by the importer as forming a trustworthy basis of comparison. In this matter, as in many others, they might try to get uniformity, but it was no use to aim at that if in the pursuit they lost exactitude and trustworthiness. He would conclude by moving a most cordial vote of thanks to Major Craigie for the extremely careful and complete paper he had submitted.

"Jevons's Coal Question: Thirty Years After." *The* Inaugural Address *of the* Right Hon. Leonard H. Courtney, M.A., M.P., President *of the* Royal Statistical Society. Session 1897-98. Delivered 14*th December*, 1897.

More than thirty years ago, Jevons arrested the attention of the heedless world by the publication of his book, "The Coal Question," and a serious anxiety was for a time engendered as to the future of our national prosperity. The grave argument of the book could not have failed to secure respect from serious thinkers, but its popular reception was largely augmented by the earnestness of two men who impressed its meaning on the nation. The candid mind of John Stuart Mill was first opened to the message Jevons had to deliver; but the effect of Mill's summons to consider it was immensely heightened when another mind of like candour and perhaps even greater eagerness made Jevons's argument the principal subject of a budget speech in the House of Commons. Mr. Gladstone accepted and emphasised the thesis of Jevons's book, and he did more, for he adopted its practical proposal, and induced Parliament to make that ampler provision for the redemption of the national debt Jevons recommended. Some reduction of that permanent burden might have been effected had "The Coal "Question" not been published, but the bulk of the diminution which has been realised, from 816·4 millions in 1865 to 644·9 millions in 1897, must be attributed to the influence of its arguments.

Jevons captured the public attention and drew Parliament to adopt in 1866 the legislation he suggested. But there were not wanting then many who thought his warnings overstrained, and questioned the support given to them by Mr. Mill and Mr. Gladstone; and I am not sure whether at this moment the balance of popular judgment would not be that Jevons's forecast was a vain terror, and the excitement produced by it the sick fancies of minds too easily moved. "After all," it will be said, "coal mining has not "ceased, shows no signs of ceasing; it has continued to increase "both in the quantities produced and the number of men employed "in it. Our main industries still occupy the foremost place; each "census shows a continued multiplication of the people, and the "amount of our national wealth has increased in a larger propor-"tion than our numbers. There are persons who are alarmed about "foreign competition, but we can no longer be disturbed with these "cries of 'wolf.' The anxious men of to-day repeat the exaggera-

"tions of their precursors a generation since, and time will show "there is as little reason for nervousness now as there was when "'The Coal Question' was published. To-morrow shall be as "yesterday, and more also." I hear language like this in many quarters, and indeed find men of political authority pronouncing Jevons a discredited prophet. If this opinion (and I believe I have faithfully represented it) be sound, it is fitting that it should be clearly demonstrated. If it is unsound, it is still more desirable that its errors should be exposed. I have thought it not unbecoming in addressing you as President, to take as my text the propositions enunciated by Jevons, and to examine, in the light of subsequent experience, how far they have been verified or refuted. Such an inquiry seems worth your attention from the nature of the subject. I enter upon it all the more heartily, because I remember how valuable Jevons was as a member and officer of this Society when living, and because I am proud to cherish his memory as an honoured friend.

Our first duty must be to ascertain with precision what it was Jevons inculcated. A very brief examination of his book ought to dispel the notion that he looked to a point of time when our coal reserves would be exhausted, or even to a time when the depths of their working would stop further supplies. What he did was to point out that if the rate of progress which had been realised for many years at the time he wrote could be supposed to be maintained, the actual consumption would within a comparatively brief time overreach the means of supply, and he therefore deduced that the rate of increase which had been noted could not be upheld. "I draw the conclusion," he writes, "that I think "anyone would draw, that we cannot long maintain our present "rate of increase of consumption; that we can never advance to "the higher amounts of consumption supposed. But this only "means that the check to our progress must become perceptible "considerably within a century from the present time; that the "cost of fuel must rise, perhaps within a lifetime, to a rate "threatening our commercial and manufacturing supremacy; and "the conclusion is inevitable, that our present happy progressive "condition is a thing of limited duration." In seeking therefore to ascertain whether Jevons has been justified, we have not to look for an exhaustion of coal fields or a cessation of mining, but to inquire whether there has been an abatement of progress such as he contended was inevitable, whether that abatement has been manifested within such a period as he contemplated, whether it has been accompanied by that increased cost of production which he declared would be its compelling cause, and whether, with the abatement of the production of coal, there has been an arrest of

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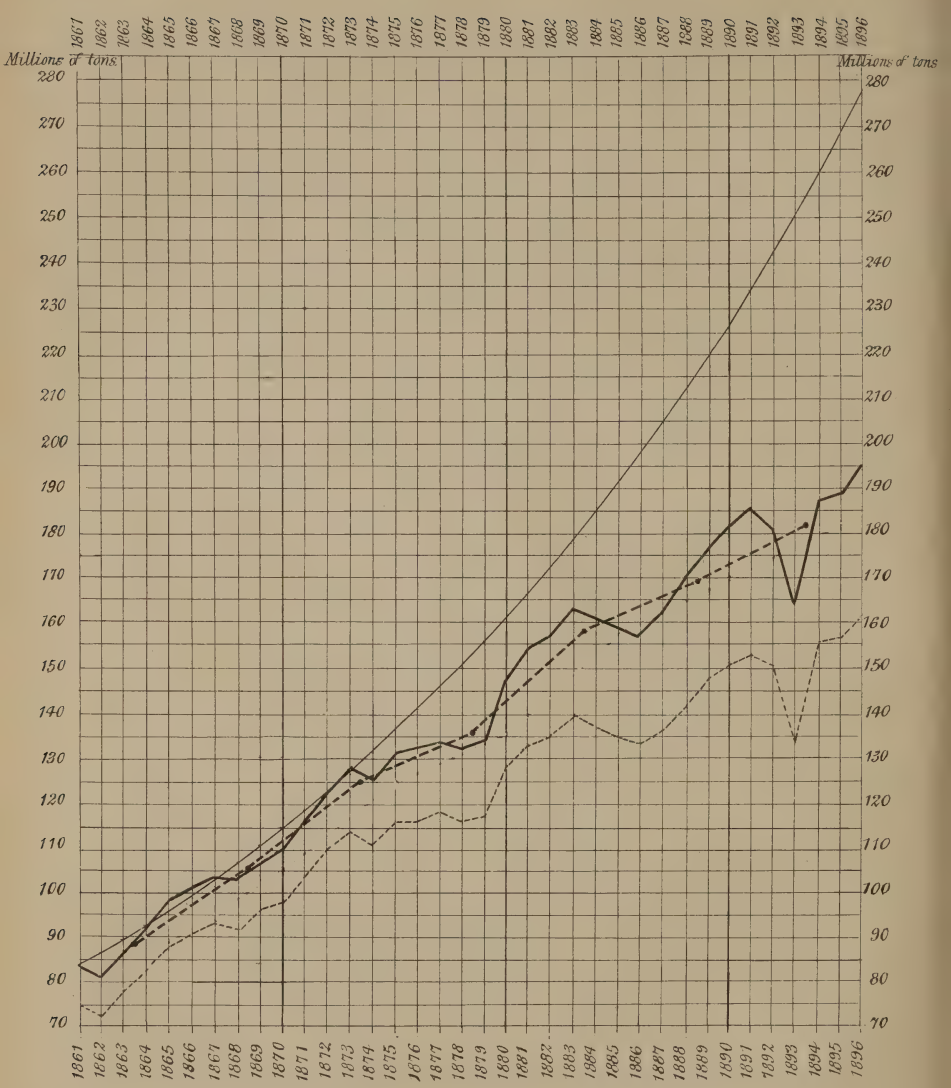

Annual production of Coal in United Kingdom, = ———

——" ——" ——" ——" —— *in averages of 5 years,* = - - - - - -

——" ——" ——" ——" —— *estimated by Prof. Jevons,* = ———

Home consumption of Coal (Production-exports), = --------

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the growth or even a decline of those great industries upon which our national predominance has been based.

As regards the fact of an abatement of the rate of progress, the figures of experience abundantly justify the anticipations of Jevons. The rate of increase at the time he wrote was $3\frac{1}{2}$ per cent. per annum, and there was statistical proof that this rate had been maintained for some years before that time; there was further evidence leading to the presumption that something like the same rate had been the law of increase from the beginning of the century; but in the absence of ascertained statistics this could not be positively asserted for the earlier years, although there was a strong probability of its accuracy. Taking the rate of $3\frac{1}{2}$ per cent., Jevons calculated the quantities of coal that should be raised if the rate were maintained according to the figures shown in the left hand column below, and I have set side by side with these on the right hand the figures which show the actual quantities:—

	In mln. of tons.			In mln. of tons.	
1861	83·6	83·6	1891	234·7	185·5
'66	99·3	101·6	'92	242·9	181·8
'71	117·9	117·3	'93	251·4	164·3
'76	140·1	134·2	'94	260·2	188·3
'81	166·3	154·2	'95	269·3	189·7
'86	197·6	157·5	'96	278·7	195·4

In special years there have been some special causes of variation; for example, the year 1893, in which the strike of coal miners materially affected the production of that year, but the general lesson of the figures is consistent and convincing. In the years which immediately followed Jevons's book, the rate of production actually increased upon what it had been, but this progress was soon turned, and by the year 1871 the amount produced was just equal to what would have been realised had the rate remained absolutely unchanged. From that point the actual production has fallen short of the old rate; the rate of increase has pretty continuously declined, until in the year 1896 the amount raised was almost exactly 30 per cent. below what it would have been had progress been unchecked. The contrast between the rate of increase which prevailed in Jevons's time and that which has been realised will be more strikingly shown if, following his example, we put in juxtaposition the curve of anticipation and the curve of realisation.

It will probably be objected that no one ever supposed that we could keep up indefinitely the rate at which we were advancing thirty years since. No prophet was necessary to assure us we should grow more slowly; and, again, it may be objected, whilst we are still growing, the decline in the rate of our growth has

not been manifested so speedily as Jevons anticipated. In truth, Jevons was far too exact a thinker to pretend to fix any date by which a great change would be accomplished. The utmost he says is that our commercial and manufacturing supremacy might be threatened within a lifetime,[1] and the figures we have noted do not in any way dispel this possibility. Whatever number of years we may take to be denoted by a lifetime, the experience of the period which has elapsed leaves open the realisation of Jevons's warning. If we may indulge in any conjecture on this head, it would be that he did not contemplate such a prompt arrest as has happened; what he feared was a continuance of our rate of increase leading to a greater development, to be followed by a more painful reaction. The turning point, which may be placed about 1871, he would probably have put later. Like most of his contemporaries, he looked for a speedier triumph of free trade principles than has in fact come about. He doubted whether the United States would maintain a policy of the Morrill tariff, which he regarded as an extreme manifestation of protection; and he expected from the colonies a gradual adoption of free trade principles. But he carefully noted that these anticipations might fail, and he wrote that, "should France revert to a less enlightened commercial policy, "should Europe maintain or extend a prohibitory system, should "the northern States succeed in restoring the union, and erecting "a permanent Morrill tariff for the benefit of Pennsylvanian manu- "facturers, and should the tendency of all our colonies towards "protection increase, the progress of trade may indeed be vastly "retarded." The rate of growth that otherwise might have been maintained might, he thought, under these circumstances soon be somewhat checked. In truth, a retardation has been brought about by the continued adherence of the United States and our colonies to protective principles, and the reversion of France to the same fallacies. The expansion that was possible has been checked, and the peril of a reaction has thus in some measure been averted. Our consumption of coal has been kept under because other countries, including our own colonies, have not by a liberation of commerce caused us to consume with heedless eagerness the transitory advantages of our situation.

If anyone challenges the accuracy of Jevons's forecast by saying that the arrest of our development has not been so great or so speedy as he foreboded, the answer is, that it really has come about somewhat earlier and more distinctly in consequence of the maintenance of conditions which he knew would cause such a retardation, but in the permanence of which he was unwilling to

[1] His context shows that he probably meant by a lifetime something like seventy years, for he puts it next inferior to a century.

believe. I must add, though deprecating any desire to provoke a controversy on the point, that in my judgment another circumstance which Jevons could not foresee when the coal question was written has materially tended to moderate our rate of increase. The dislocation of the currencies of the world, whereby, instead of having as we had *de facto* up to 1873, one and the same standard throughout all commercial nations, there now prevail two, separated and divergent from one another, is a factor in the problem which I could not overlook, though I do not desire to enlarge upon it. Whether gold be dearer or silver be cheaper, the two metals have changed in relative value, and the indisputable consequence, that the burden of fixed charges and conventional payments in silver countries has been lightened compared with the same burden in gold countries, has produced an effect, be it greater or less, injurious to the competition of industry in the gold countries with industry in the countries using silver. I do not pretend to measure the amount of this influence, but whatever its importance, it must tend to repress the rate of development in the United Kingdom.

Another factor affecting the development of coal mining must be noticed, though it may be difficult or impossible to suggest any definite numerical estimate of it. From the time Jevons wrote down to the present there has been, partly through legislation, partly by consent after what may be called domestic negotiations, a continuous amelioration of the conditions of the miners' work making it less strenuous and exhausting, and though the effect of this may have been in some measure compensated by improvements in the method of work, these improvements or similar changes have been effected in the competing industries of other countries to a far greater extent than changes in the conditions of work of the labourer. I should be the last to intimate any dissatisfaction at the lessening of toil on the part of our coal miners. But the fact must not be overlooked in its bearing on the comparative production of coal. It may indeed be said that our natural advantages have been used and not abused when we have seized upon them as the means of enabling the coal miners' lot to be better here than elsewhere. But this action must also have operated to keep within narrower bounds the expansion of our industry, and in this degree repressing that development that would otherwise have ensued.

For the reasons I have stated, I think it fair to hold that the period within which the abatement of our progress has been manifested is at least as brief as Jevons contemplated, and I shall presently have to examine the serious character of this abatement in relation to special industries. But it is fitting first to consider

whether what I have called the compelling cause of this falling away has been such an increase of cost as Jevons forecasted. In his book he cited the average shipping prices of Newcastle coal from 1771 to 1860, as the only series which could be relied on as trustworthy, and which afforded a safe measure of comparison between successive variations. Taking up this series with the price and the year last given by himself, it runs as follows :—

Price of Coal per Ton at Newcastle.

	s.	*d.*		*s.*	*d.*
1860	8	5	1879	7	9
'61	8	3	'80	7	11
'62	8	4	'81	7	9
'63	8	3	'82	7	9
'64	8	3	'83	7	7
'65	8	9	'84	7	10
'66	9	3	'85	7	7
'67	9	8	'86	7	2
'68	9	4	'87	7	1
'69	9	–	'88	7	–
'70	9	–	'89	8	4
'71	9	–	'90	11	5
'72	14	5	'91	10	4
'73	20	5	'92	9	5
'74	16	11	'93	8	3
'75	13	2	'94	8	7
'76	10	9	'95	7	9
'77	9	9	'96	7	2
'78	8	7			

This series appears to falsify Jevons's forecast. In the years which immediately followed his book, the price showed a tendency to rise, till it culminated in the famine year 1873. But from that point it fell away again, and although there has been an upward movement since, it leaves off with a lower price than obtained in his time. But he himself has proved that the actual money prices for successive years cannot be always taken without correction as exhibiting the real variations of cost of production. There must, as he says, be taken into account the "variation of the value of the "currency." Thus he quotes the price of coal in 1794 at 7*s.* 6*d.* per ton, and in 1860 at 9*s.*,[2] showing an apparent increase of 20 per cent., that is, from 100 to 120. But a comparison which he had made of certain index numbers showed that the price of about forty of the chief materials of commerce fell between the years 1794 and 1860 in the proportion of 100 to 62, and he therefore rightly deduces that the real rise in the cost of production of coal in this interval was from 62 to 120. Applying the same method of reasoning, we may use Sauerbeck's index numbers to obtain a true estimate of the course of movement in the price of Newcastle

[2] This price is quoted by Jevons (p. 61) from the "Mineral Statistics of "1860." The Board of Trade, however, in a private communication to me, now quote the price of coal in Newcastle in 1860 as 8*s.* 5*d.* In my tables of prices I have therefore adopted the last authoritative quotation.

coal since Jevons wrote. The result is that though the money price of coal is less in 1896 than in 1860, its relative cost is really greater. Sauerbeck's index number for 1859-61 stands at 99, and the index numbers from 1880-96 are given below. Against the index numbers I have placed the registered prices of Newcastle coal, and in the last column are corrected valuations, that is to say a record of what these prices would have been had the basis of valuation been stationary:—

	Index Number.	Registered Price at Newcastle.		Corrected.	
		s.	*d.*	*s.*	*d.*
1860	99	8	5	8	5
'61	98	8	3	8	4
'62	101	8	4	8	2
'63	103	8	3	7	11
'64	105	8	3	7	9¼
'65	101	8	9	8	6¾
'66	102	9	3	8	11¾
'67	100	9	8	9	6¾
'68	99	9	4	9	4
'69	98	9	–	9	1
1870	96	9	–	9	3
'71	100	9	–	8	10¾
'72	109	14	5	13	1
'73	111	20	5	18	2½
'74	102	16	11	16	5
'75	96	13	2	13	7
'76	95	10	9	11	2¼
'77	94	9	9	10	3
'78	87	8	7	9	9
'79	83	7	9	9	3
1880	88	7	11	8	11
'81	85	7	9	9	–¼
'82	84	7	9	9	1¼
'83	82	7	7	9	2
'84	76	7	10	10	2¼
'85	72	7	7	10	5
'86	69	7	2	10	3¼
'87	68	7	1	10	3¾
'88	70	7	–	9	10½
'89	72	8	4	11	5½
1890	72	11	5	15	8
'91	72	10	4	14	2
'92	68	9	5	13	8
'93	68	8	3	12	–
'94	63	8	7	13	6
'95	62	7	9	12	4
'96	61	7	2	11	7

This table shows that whilst there have been variations from year to year attributable to special causes of disturbance, the course of real cost has been manifestly upward. The price of

coal compared with the prices of the typical and numerous commodities on which Sauerbeck has based his tables, shows that Newcastle coal has become relatively more costly, which is what Jevons predicted. If we took any other list of prices, such as the average price at the pit's mouth in England and Wales, or indeed in Great Britain, the same phenomenon would be exhibited, though it would be an apparent fall in price converted into a rise when corrected in the fashion Jevons himself indicated as the true way of arriving at a right comparison. At the same time it must be admitted that the increase of cost is not very considerable, and quite recently has shown a tendency to fall rather than rise. We shall find the explanation of this when we turn to the facts of the production of coal in the United States, showing coal produced at the pit's mouth with an abundance and a cheapness restraining the possibility of further increase of price here.

Opinions may differ as to whether Jevons's anticipations have been sufficiently verified in degree. Some may think that his alarms required a more palpable arrest of the rate of increase and production, and a more marked increase on the cost of production. But there can be no doubt as to the fulfilment of his predictions in substance under each head, and those who have best appreciated his reasoning, will not think the numerical demonstration of his accuracy insufficient. He never spoke of an immediate change, but he forecasted a slackening up to a point when the comparison of the advantages of our position with those of our competitors would be more equal, after which the movement would almost certainly be accelerated. As I have already indicated, the conditions of production of coal here and elsewhere have been equalised. But meanwhile we will point out that in another direction Jevons's warnings have come true. Whilst he said that we must expect a retardation of the increase in the production of coal over Great Britain as a whole, this general slowing down would be due to changes differing widely in character in the different central areas of production. In some districts the rate of increase might still increase for a certain number of years, and in others it would decline, and in some it would be converted into an absolute diminution of produce. The pressure of demand will find out the points where the cost of production was or tended to become aggravated, and in such places all degrees of arrest might be expected.

These anticipations have, in effect, been realised. The valuable tables of Mr. Price-Williams, which summarise the figures of production from the time Jevons wrote down to 1887, show that in the course of that period there was an absolute change from increase to decrease in Shropshire, Cheshire (and at the very end

of the period) in Staffordshire, Worcestershire, and Gloucestershire, while the rate of increase declined to very small proportions, becoming almost stationary in Leicestershire and Somersetshire; and the rich fields of Northumberland and Durham showed a falling away from an average increase of 4·5 per cent. in the years 1854-65, to 1·47 per cent. in the years 1866-87; the coal fields of South Wales being the area where the output was so maintained (the average increase from 1866 to 1887 was 3·57) as to keep the produce of the entire island up to the level already described. In Mr. Hull's book, "Our Coal Resources at the Close "of the Nineteenth Century," published this year, we find a confirmation of the observations of Mr. Price-Williams brought down to the present time. We all know Mr. Hull to be of the highest authority on this question; Jevons took his earlier work as the basis of much of his own reasoning. Mr. Hull divides the coal producing area of the kingdom into progressive, stationary, and retrogressive districts, agreeing in their main outlines with the classification of Mr. Price-Williams.

The source of the great danger to our industrial supremacy which Jevons detected lay in the United States. There might be in other quarters centres of development out of which industries might grow, nullifying the possibility of the importation of our manufactures within the surrounding areas. But from the United States might be expected developments of production that might drive us from neutral markets, and indeed turn back the tide of commerce upon our shores. To this quarter we must look to see what has happened since Jevons wrote. The production of coal in the United States, and the average price per ton at the pit's mouth, are shown in the following table:—

	Coal Output. (In mln. of tons.)		Rate of Increase every Five Years.		Price at Pit's Mouth.	
	Great Britain.	United States.	Great Britain.	United States.	Great Britain.	United States.
					s.	*s.*
1861....	86·0	16·4	—	—	—	—
'66....	101·6	23·9	18·1	45·7	—	—
'71....	117·3	35·4	15·4	48·1	—	—
'76....	133·3	51·6	13·6	45·7	—	—
'81....	154·3	76·8	15·6	48·8	—	—
'86....	157·5	100·6	2·2	30·9	4·83	6·41
'91....	185·4	150·5	17·7	49·6	8·00	5·33
'92....	181·8	160·1	—	—	7·25	5·41
'93....	164·3	162·8	—	—	6·83	5·33
'94....	188·3	152·4	—	—	6·66	5·08
'95....	189·7	172·4	—	—	6·64	4·75
'96....	195·4	*170·0	5·4	13·4	—	—

* Approximate.

These figures show that whilst in 1861 the total coal produce of the United States was less than one-fifth of the amount raised in the United Kingdom, the total quantities raised in the two countries had in 1895 approached to very nearly an equality, and this result is of course due to the fact that year by year the rate of increase in the States was greater than the rate in the United Kingdom, and that on the other side of the Atlantic this annual rate, though subject to some variations, was on the whole maintained at the same level, whilst in the United Kingdom it has been almost continuously decreasing. The time therefore when the coal production of the States shall equal that of Great Britain is at hand, if it has not been reached, and the significance of this fact is heightened when we compare the average price of coal at the pit's mouth in the two countries. In the earlier years of the period the price was lower with us than in America. But from the year 1889 downwards this has been reversed. Coal has been uniformly cheaper on the other side of the Atlantic, and the disparity has become extremely marked; the American price being generally 20 per cent. less than the corresponding price here, while in one year it was 36 per cent. less. When such results have been realised, there is no reasonable ground for hope that the rates of movement to which attention has been called will not for some time be maintained, and the home production not only equalled, but rapidly out-distanced by our great competitors.

Jevons's speculations were mainly concerned, as the title of his book shows, with the development of the coal industry. But in tracing what he conceived must be the consequences of a growth which threatened to eat away the conditions of our supremacy in this trade, he was most emphatic and most precise in his forecast respecting the production of iron. Iron he described as the "bone, sinew, and muscle of our labouring system;" and again he says, "Iron, as the material of our machinery, is almost the "best measure of our wealth and power." Reviewing the course of iron manufactures, he showed that the production of pig iron had continuously increased at a geometrical ratio, which had been maintained up to 8 per cent. per annum to within a few years of the time he wrote, and though he had to notice a recent decline to 4 per cent., he regarded this as probably transitory, being due to the falling off of the American trade through the operation of the Morrill tariff. Whilst the production of pig iron had been thus continuously advancing, the exportation of iron of all kinds had moved at a still greater rate, having more than doubled in the eight years from 1849-57, although after that date there had been a comparative arrest analogous to that he had noticed in the

production of pig iron. He looked forward, however, to a revival of activity, "amply compensating" the then "recent dulness," and he concluded, that, "expanding as it does, the iron manu- "facture must soon burn out the vitals of the country; and it is "possible that there are those now living who will see the end of "the export of crude iron; so rapid is the development of the "trade, that its rise and decline may perhaps be compassed by two "lifetimes." This is a very precise forecast. As I have already said, Jevons seems to regard the disturbing effects of hostile tariffs as more transitory than they have proved to be, and his anticipations must be subject to corrections in consequence of this adverse influence. On the other hand, the processes of iron manufacture have undergone radical changes since he wrote, and greater economy of production must be admitted as a compensation on the other side. Let us turn, however, to the figures to see what the actual course of production has been, and what the movement in our export trade. The following figures show our production of pig iron at intervals of five years down to 1880 and from that date annually :—

1861.....	3·71	1 = mln. tons.	1886.....	7·01	1 = mln. tons.
'66.....	4·52	„	'87.....	7·56	„
'71.....	6·63	„	'88.....	8·00	„
'73.....	6·57	„	'89.....	8·32	„
'76.....	6·56	„	'90.....	7·90	„
'80.....	7·75	„	'91.....	7·41	„
'81.....	8·14	„	'92.....	6·71	„
'82.....	8·59	„	'93.....	6·98	„
'83.....	8·53	„	'94.....	7·43	„
'84.....	7·81	„	'95.....	7·70	„
'85.....	7·42	„	'96.....	8·66	„

They show that there was a considerable increase down to 1873, when there was precipitated, as we know, the warning of a coal famine, which brought about a great reduction, and the falling off was not recovered till the close of that decade. The years that followed maintained the level of prosperity, but after 1883 there was again a decline, and it may be said that from that year until quite recently there were no signs of renewed growth. The experience of the thirty years may be roughly divided into two periods, the one marking an advance, the other a stationary if not a receding industry, results which support, if they do not in every particular fulfil, the anticipations of Jevons. The period within which he looked for a decline has not been completed, but many years in the interval have been marked by an absolute decline in production. As to exportation, the following table

shows the total of iron of all sorts exported, arranged in the same way as the table giving statistics of production :—

1861.....	1·359	1 = mln. tons.	1887.....	4·143	1 = mln. tons.
'66.....	1·762	„	'88.....	3·967	„
'71.....	3·169	„	'89.....	4·186	„
'76.....	2·224	„	'90.....	4·001	„
'80.....	3·793	„	'91.....	3·240	„
'81.....	3·820	„	'92.....	2·739	„
'82.....	4·354	„	'93.....	2·857	„
'83.....	4·043	„	'94.....	2·650	„
'84.....	3·497	„	'95.....	2·836	„
'85.....	3·131	„	'96.....	3·550	„
'86.....	3·388	„			

These figures show that Jevons was quite right in regarding the arrest of increase at the time he wrote as transitory. The total export increased again, in fact doubled in about ten years. From this (1873) there was a decline to near the end of the decade, when it rose again and reached a maximum of 4,354,000 tons in 1882. From this maximum it fell, with occasional attempts at recovery, but again so decisively that between the years 1891-96 the total was continuously below 3,000,000 tons, the export of last year being in fact one million tons, or about 20 per cent., less than the maximum of 1882. It must, however, be added that this decline in exportation has not been accompanied by an increase in price. Strange as it may appear, prices have fallen away simultaneously with a decline in export, and the occasional revivals in export have been in years when prices have also risen. Even after making allowance for the general drop in the range of prices, there has been a falling away in the prices of exported iron. The truth seems to be that the course of the trade has been more influenced by changes in the demand elsewhere, especially in the United States, than by changes in the condition of production at home. High import duties have operated to check our development, and it has only been when local demands have overreached local supplies, that our export trade has been stimulated to a concurrent rise in quantities and prices. Tariffs have interfered with that continuous development of our industries which Jevons contemplated, and their operation must be admitted to have modified the verification of his conclusions.

If we turn to the statistics of production in the United States, we shall find abundant proof of an increase in iron. Starting from a production of 821,000 tons in the year 1860, it reached 9,400,000 tons in the year 1895; or, comparing the States with ourselves, the production here in 1860 was four and three-fifths times as great as in the United States, whereas in 1895 our production

was to theirs as 77 to 94, or a little less than five-sixths. Special years indicate variations in the rate of increase on the other side of the Atlantic, but the growth has never been turned back, and on the whole it has been fairly uniform, nor is there any apparent diminution at the close of the period. As has been already intimated, this growth of the iron industry has been largely stimulated by protective duties. In the earlier years the prices of iron and of steel in the States were much in excess of corresponding prices here; but this difference has tended to disappear, and the comparison of the prices from 1890 downwards exhibits the progress of equalisation. At the present time the difference is such that the freight across the Atlantic would make the cost on delivery of British and American iron in America nearly identical. If my view is correct, the anticipations of Jevons may be falsified in detail, but his reasoning is confirmed in substance. The barrier of import duties impeding the course of trade, arrested that rapid consumption of our advantages which he forecasted; but the time has been reached when the conditions of our supremacy are vanishing, since not only the total produce of coal across the Atlantic is nearly abreast, and of iron is in excess of our own, but the average price of American coal is below ours, whilst the average price of iron and of steel has almost approached equality.

	Pig and Puddled Iron.		Steel Rails.	
	United Kingdom.	United States.	United Kingdom.	United States.
	s.	*s.*	£	£
1861	48·81	81·00	—	—
'66	62·62	187·52	8·40	33·20*
'71	61·08	140·48	8·24	20·50
'76	62·47	89·00	8·92	11·85
'81	55·38	100·48	6·90	12·22
'86	43·17	74·84	4·72	6·90
'90	61·10	73·60	5·47	6·35
'91	52·51	70·08	5·03	5·98
'92	51·49	63·00	4·40	6·00
'93	46·92	58·08	4·16	5·62
'94	46·04	50·64	3·95	4·80
'95	47·94	52·40	3·83	4·86
'96	47·80	—	4·46	—

* For 1867.

The situation may be summed up in the authoritative words of the President of the Board of Trade. Speaking, so recently as the 23rd of last month to his constituents at Croydon, Mr. Ritchie said, "in his opinion, although we had to fear the competition of "Germany, we had to fear tenfold the competition of the United

"States. In fifteen years the United States had more than "doubled her output of pig iron, and increased her production "of steel five times, and now produced twice the quantity of steel "and as much pig iron as Great Britain." These statements are doubtless based upon returns in possession of the Board of Trade indicating the development in the last year, which I have not yet been able to verify.

I do not propose to follow Jevons in an examination of the experience of other industries in comparison with his anticipations. An observation may however be hazarded. The United States have advanced with extraordinary rapidity in the production of coal and iron, till they have become abreast of ourselves. Domestic consumption has increased simultaneously with production; but it may be asked whether the signs do not indicate that the time is at hand when the production of the States, satisfying and more than satisfying their own demand, may not bring about a competition in neutral markets, pressing with more severity upon ourselves than anything we have hitherto experienced. The analysis of Mr. Mulhall in the "Contemporary Review"[3] shows that there has already been a considerable rise in the proportion of commodities imported into our colonies from the United States, and it is to the development of this increase that attention should be directed. I can do no more at present than indicate a field which should be carefully examined.

In scrutinising the years that lay before him, Jevons was most interested in the future of the human beings inhabiting these islands. Convinced as he was that the conditions of our industrial supremacy must more or less rapidly pass away, the patriotic regret he felt at the inevitable change in our position was qualified by the thought that the foremost places would be occupied by our kinsmen, speaking the same tongue, and to a large extent inheriting the same traditions, while the progress of

[3] "Contemporary Review," November, 1897:—

Among Mr. Mulhall's conclusions the following may be reproduced.

"1. That the trade of the colonies, compared with ten years ago, has risen "8 per cent.

"2. That their trade with Great Britain has increased 2 per cent., with foreign "countries 30 per cent.

"3. That their consumption of British merchandise has declined 6 millions "sterling, while their imports of foreign goods have increased 10 millions.

"5. That inter-colonial trade has fallen 25 per cent., and has a tendency to "decline precisely as trade with foreign countries increases.

"6. That the increased consumption of foreign merchandise is most marked "in the East Indies and Canada.

"7. That colonial exports to Great Britain have risen 12 per cent., to foreign "countries 32 per cent.

"9. That the weight of colonial exports to foreign countries has grown exactly "50 per cent.

mankind as a whole would be advanced, although we ourselves might be outrun. But the trials of the people of these islands in the period of transition remained a source of great anxiety to him. Throughout the century our population had continuously advanced. The facilities for the production of coal and of the industries built up upon it made this possible and made it certain. Yet, as he carefully showed, this advance in our population as a whole was co-existent with a decline in the number of the inhabitants of the rural counties. He said there was an old and a new England. The new England of mining and manufacturing prosperity attracted to itself immigrants from the rural counties, and its population grew by this inflow as well as by the natural increase of births. At the same time our progress in the arts and in navigation facilitated colonisation (under which head movement to the United States must for this purpose be classed), and armies of adults swarmed off annually to the attractive fields over seas. The pressure of actual want stimulated this out-pouring from Ireland for some years, but from Great Britain, and even from Ireland in recent times, emigrants had not gone forth so much on account of a straitened future at home as by reason of a larger promise abroad. What, however, he asked, would happen when with a slackening of industrial progress there should no longer be that demand in "New England" which had absorbed so much of the growing population of "Old England," and when emigration would be stimulated by the necessity of escaping from evil conditions rather than by the hope of a more easy life. Must we look forward to congested districts, where there had been busy and prosperous hives of men, or would natural restraints be found sufficient to ensure an adjustment of the growth of population to the new conditions of industrial life? Jevons does not seem to have thought that any political action could be taken which would be of real value in coping with the difficulties of the future. He tried to impress upon his readers the necessity of husbanding our resources in the days of prosperity, so as to meet adverse times on better terms, and he did, as we know, succeed in obtaining a legislative response to his appeal; but he had no panacea for dealing with bad times themselves if they should arrive. A survey of the movement of population since Jevons wrote is on the whole satisfactory: it is in entire conformity with his fundamental reasoning, but it may be said to give us more encouragement in facing the future than he felt. It is necessary however to read the statistics with some discrimination before we can arrive at these conclusions. The population of England and Wales, which had increased in the decade 1851-61 by 11·9 per cent., to which figure the rate had consistently

declined for forty years, jumped up again and grew by 13·2 per cent. in 1861-71, and 14·4 in 1871-81. There was here no slackening of increase, on the contrary the rate had advanced. At first sight this increase must appear perplexing: concurrently with a retardation of movement in our greatest industries, we find an acceleration of growth of population. The phenomenon seems to be explained when we remember that the decade 1861-71 was largely occupied by a great civil war in America; and again, that in the years from 1873-80 there was a great arrest of industrial development in the United States; whilst the effect of the Franco-German war gave a passing stimulus to production at home. Each of the two decades was marked by a falling off in the mass of emigrants, and indeed in the period 1871-81 the total emigration from England and Wales did not much exceed the total immigration. During the greater part of these twenty years causes were at work impeding the outflow which had characterised former decades, and to this it would seem must be attributed the increase of growth and population.

This analysis would lead us to expect some development of pressure upon the means of subsistence during these years; as a matter of fact, however, no signs are apparent of a decline in the wellbeing of the masses of the nation, and we are presented with an apparent contradiction in the two facts, that population went on increasing at a more rapid rate whilst the rate of increase of our main industries was declining. There was, indeed, a sharp reaction of population in the next decade; but there is another fact revealed in the vital statistics of these years which has great weight in relation to the difficulty we are considering. The marriage-rate, which had continued slightly to rise in the first years of the decade 1861-71, so that in 1865-66 it had reached 17·5 per thousand, fell from that time almost continuously till it had declined to 14·9 in 1880. The marriage-rate has long been recognised as a measure of the material prosperity of the people, and in a decline of the marriage-rate and the outflow of emigration statesmen have found the only natural, and so to speak, automatic means of relieving a country whose industries are not keeping pace with the growth of the population. Emigration was more or less blocked in the years under review, but the marriage-rate fell with a rapidity we have noticed. In the next decade, 1881-91, emigration was resumed on a large scale, and the marriage-rate showed some tendency to revive; but the birth-rate began to decline, and has almost continuously fallen away ever since. Starting from 33·9 per thousand in 1881, it reached 30·2 in 1890, and the result of this decline and of the revival of emigration appears in the fact that the rate of increase of population in England and

Wales, which had reached 14·4 between 1871-81, fell to 11·7 from 1881-91, the lowest rate of increase shown during the century. It is not unnatural, indeed it should be expected, that preventive checks do not come into operation instantaneously on a change in the conditions of industrial progress; but their influence began to be felt after what cannot be regarded in such a question as a long delay, and the movement of population is seen to follow a decline in our industrial growth in such a way as to moderate the gravest apprehensions that might otherwise be felt as to the future. This modification in the increase of our population has necessarily been noted by many; it is too obvious a phenomenon to be overlooked, and one acute analyst has given reasons for believing that about the year 1991 the population of the United Kingdom will become stationary.[4] This may seem too remote a date to excite anxiety, but the writer has not connected it with the material cause to which such an arrest must be due. If I am right in thinking that this movement towards a stationary condition is a natural result of changes in our industrial prosperity, the point of time might be naturally accelerated by larger developments of change, the fear of a congested population struggling with insufficient means of subsistence, yet showing no symptom of diminution in mass, may be allayed. The constant progress of invention, the increasing facilities of transport, and the progressive subdivision of labour, all tend to make the conditions of existence easier; and it may be found possible to support without difficulty, after a decline in our mining and manufacturing supremacy, a population which had come into existence under the impulse of the prosperity which will have waned if it has not entirely passed away.

It may be objected that in pursuing the speculations of Jevons through the years that have intervened since he wrote, I have taken no account of German development, nor of the appearance of Japan in the circle of competition. Jevons himself took some measure of German possibilities, and dismissed them as something that could be neglected in comparison with American promise. The coal fields of Germany are relatively small, and a comparison of the cost of production there and here can occasion no alarm; and although the development of German production has been proportionately great, effective competition on a large scale between Germany and the United Kingdom may be left where Jevons put it, in the background. We have seen how Mr. Ritchie has dismissed it, when set side by side with that of the United States. As

[4] "Economic Journal," vol. v, p. 505. "The Probability of a Cessation of the "Growth of Population in England and Wales during the next Century." By Edwin Cannan.

for Japan, it has almost come into being as an industrial factor since the appearance of Jevons's book. It is probably destined to occupy a great place in the future organisation of manufacturing industry in the East; but so far its energies may be said to be absorbed in the field they have created; and though the waves of competition may extend from Japan so as to mix with our own outpourings, there is as yet little to be recorded of their meeting.[5] In any case the development of Japan would not extenuate the gravity of the warnings of Jevons. Something similar may be said of the interesting future of New South Wales and New Zealand.

It is necessary to notice, though only for a moment, the suggestion often made, and doomed to be often repeated, that inquiries into the instability of industrial power founded upon the possession of cheap coal are futile, because coal itself will be superseded as a spring of motive energy. Jevons did not overlook this plea. It is true that since his time there has been an immense development in the use of the force of falling water by transmuting it and making it portable through electrical change; and it would be idle to put limits to the extent to which such application may be carried, or to circumscribe the possibilities of utilising other forces we have never as yet been able to bring under our control. But the answer to all this supplied by Jevons is final: we are concerned with our own supremacy, and the suggestion that we may be indifferent to the consumption of the element upon which that supremacy is founded, because other factors may be discovered in respect of which we have no special advantage, is idle. The discovery would only make shorter work of the loss of our position. Speaking of such suggestions, Jevons said: "Such a discovery would simply destroy our peculiar industrial "supremacy. Electricity has already been zealously cultivated "on the continent with this view; England, it is said, is to "lose her superiority as a manufacturing country, inasmuch as her "vast store of coals will no longer avail her as an economical "source of motive power. And while foreigners clearly see that "the peculiar material energy of England depends on coal, we must "not dwell in such a fool's paradise as to imagine we can do "without coal what we do with it."

The review of the facts of experience since Jevons wrote seems to me to justify abundantly his prognostications. He could not of course foresee every disturbing cause which may have

[5] This is perhaps too broadly stated. I have been told by an owner of a fleet of liners to the East, that his ships coal for the homeward voyage with Japanese coal at Singapore; and Ceylon may be regarded as the meeting place of English and Japanese coal. The coal of New South Wales is creeping to the same centre.

modified in a minor degree the course of subsequent industrial history, but the main outlines of his prophetical draft have been filled up, and the seriousness of his warnings amply confirmed. The progress of the growth of our coal-mining has slackened; in some quarters there has been an arrest of growth, and in some an absolute decline, while the iron trade, the vitality of which depends so much upon the relative ease and cheapness of coal production, has undergone the most extraordinary vicissitudes. The United States, to which Jevons pointed as our inevitable competitor, now produces coal in as great abundance as Great Britain, and at a cheaper price, while in respect of iron the trade of the republic is equal to our own, and in the matter of steel is declared on authority to be twice as great. The people of this island have not realised the changes that have supervened, and in this respect are like the personage of Mrs. Thrale's poem, but it is not the less clear that we have had our warnings. The first sharp stroke came in 1873, and if subsequent attacks have not been so marked, their effect is too evident in the tell-tale figures of our trade. The most careless, when brought face to face with these, must see how idle is the optimism which men of repute appear to think good enough for public platforms. We are assured that the position of Great Britain cannot be endangered as long as the energy and character of its inhabitants remain unimpaired. The character and energy of the people of Ireland cannot be said to have altered for the worse in the latter half of the century, yet an economic revolution has reduced the population of that island by one half, bringing back the total to something like the figure from which it started when the century began. In England itself we know how a decline in the population of what Jevons called old England, the rural counties, has set in and been maintained, yet no one can say that the dwellers in rural England have degenerated. Use made of the opportunities must vary with the charater of the men that command them. But no excellence of character can make men independent of the circumstances amid which they are placed. My own mind was and has perhaps remained more disposed to receive the teaching of Jevons, because of the experience I have witnessed, to which, at the risk of repeating what I may have said before, I must be permitted to refer. My native county of Cornwall is a peninsula which can be easily isolated by the imagination, and in its history during the last fifty years we may see in miniature something more than a suggestion of what may happen in Great Britain. In the first half of this century copper and tin were raised from mines scattered far and wide throughout the county. The following figures will show what has been the history of the production of

copper in the United Kingdom, Cornwall being almost the one source of supply from the year 1841, and what has been the importation of copper from without :—

	Output of Great Britain.	Imports.
	Tons.	Tons.
1841–50	96,266*	33,726
'51–60	124,439	115,288
'61–70	116,280	310,014
'71–80	47,000	489,530
'81–90	22,740	534,630
'91–96	3,222	374,662

* Cornish mines only.

These figures show a production which has continuously declined, from 1860 at least, and more rapidly as the years went by, until it has become almost nominal, while the total consumption of copper supported by importation from abroad has steadily advanced, and this great change has not been due to any absolute exhaustion of copper mines at home, but to the relatively greater cheapness of production elsewhere.

The figures of the production of tin are not at first so striking, but when properly read are equally corroborative of the lesson Jevons taught. The actual total production until 1892 did not much fall off ; but it has since rapidly declined, and an examination of the mineral statistics will show what is known to those acquainted with Cornwall, that the up-keep of production so long as it was maintained was due to two or three rich mines clustered close together in one spot, whilst the numerous mines found in other parts of the county were almost all abandoned. It must be added that while production has thus been maintained through a few rich mines, the importation of foreign tin has grown even more rapidly than the importation of foreign copper. The cheapness of production elsewhere, chiefly in the East, has caused the abandonment of mines that might otherwise have remained in working, the survivors alone being able to stand the competition which threatens the existence of almost every one of them.

	Output for Great Britain.	Imports.
	Tons.	Tons.
1841–50	—	11,378
'51–60	63,329	26,049
'61–70	93,029	48,692
'71–80	96,544	132,617
'81–90	90,334	257,364
'91–96	47,273	210,407

Energy and character have not been wanting among the inhabitants of the county, but no endowment of energy and character can prevail in face of a struggle handicapped by greater facilities of production abroad. Energy and character have indeed been shown by the migration of Cornish miners to these richer fields. The population of the county has followed in its movement the course of its mining. The figures below[6] show that it grew rapidly up to the middle of the decade 1841-50, when its growth was forcibly checked, and fell away, till after 1860 an absolute diminution was developed, which has been exhibited in every subsequent census. It appears possible that the lowest level has been reached, the population having adjusted itself to new circumstances, and the next census may reveal a stationary condition, or even a slight upward movement. But the Registrar-General assumes that the decrease continues, and his estimate of numbers to the middle of the present year was only 312,735. Whatever may be the exact truth on this point, the experience of the county remains, with its serious suggestion of a possible analogy to the future experience of Great Britain. A large rate of increase was arrested and gradually converted into a considerable decline, the quantity of the population being governed by the imperious fact that the conditions which gave the county a supremacy, we may almost say an exclusive possession of particular metals, have passed away.

The function of the statistician is discharged when he has traced out the facts of recent experience as confirming or refuting the anticipations of the economic thinker, and I have no intention of entering upon the tempting field of speculation concerning the course of political action which these inquiries suggest. This was a necessary part of the work of Jevons, but it is sufficient now to observe that, after reviewing many proposals, he approved of one only, that of utilising our years of prosperity to relieve the nation from the traditional burden of debt so as to be better prepared for years of severer struggle. We know that his appeal met with a response, and a sensible reduction of the debt has been effected, although scarcely so large as he himself would have desired. The proposals which he examined and dismissed had generally for their aim the holding back of our special resources,

[6] Population of Cornwall—

1841	342,159	14 per cent. increase.
'51	355,558	4 „
'61	369,390	4 „
'71	362,343	2 per cent. decrease.
'81	330,686	9 „
'91	330,521	3 „

so that by restraining their too rapid consumption we might prolong the period in which we should have the advantage over competitors. An export duty was most prominent among the suggestions he thus examined. As to all of them it may now be remarked that as the time has apparently come when our greatest rivals are abreast of us, if not overreaching us, they have become obsolete and out of date. We might have practised a reserve when we were ahead, we cannot fall back upon it when we have as our greatest difficulty the task of holding our own. But if, as we must believe probable, the strain of competition becomes severer, if the slackened pace of progress dies into a stationary condition, or even passes into a movement of retrogression, old suggestions will be revived, and new suggestions may also be expected to appear. The words of Jevons in contemplating such a future were: "I "know not how to express the difficulty of the moral and political "questions which will arise." But his own conclusion was "not "to give way to weak discouragement concerning the future, "but rather to learn to take an elevated view of our undoubted duties and opportunities in the present."

No better attitude can be assumed to-day. If our future as an industrial nation cannot be independent of the economic causes which call great populations into being and move them to and fro upon the face of the earth, we can at least resolve that our altered state shall not be associated with any sordid degradation of our countrymen, shall not be darkened by slowly gathering clouds of deeper poverty. But these evils cannot be averted by merely wishing that they shall not come to pass, nor can they be evaded by the adoption of a fallacious policy of isolation. We have grown to be what we are because we have been able to supply some of the primary wants of mankind at the least cost of labour, and if the relative loss of our advantages takes away from us this predominance, we cannot escape the consequences by impeding the freedom which has been the means of our growth and must remain the condition of our vitality. The true way of meeting the difficulties of the future must be through spreading among the people an understanding of its probable course. In an intelligent appreciation of our situation lies the best promise of a perception of personal and national duty. Right knowledge here as elsewhere must be the basis of right life.

Proceedings *on the* 14*th* December, 1897.

After the preliminary formal business of the meeting,

The President delivered his Inaugural Address, and at its conclusion,

Mr. A. E. Bateman said it was the custom for the vote of thanks to the President for his inaugural address to be proposed by the senior or the junior past President. In the present case the senior past President, Sir Rawson Rawson, was at the meeting, but, as he was going to take the chair elsewhere, he had begged off the duty, and it therefore devolved on the junior past President. It had not been an easy matter to persuade Mr. Courtney to accept the Presidentship, for, with great justice, he pleaded the work he had done and was doing, and also the fact, which they all deplored, of his impaired sight. He had, however, given them an address which he ventured to say was superior to many and equal to any which had been delivered before the Society. It was not the custom to discuss the Presidential Address, so he had simply to return to Mr. Courtney on behalf of the meeting their most cordial thanks for having accepted the office of President, and for the very excellent and instructive address he had given them.

Mr. R. Price-Williams in seconding the vote of thanks, said that every one must recognise the national importance of the subject of the address, and the masterly way in which Mr. Courtney had dealt with it.

Major P. G. Craigie (Hon. Secretary) then put the resolution to the meeting, when it was carried with acclamation, and the proceedings terminated.

On the Theory *of* Correlation. *By* G. Udny Yule.

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I.—*On Correlation in General. Introductory.*

The investigation of causal relations between economic phenomena presents many problems of peculiar difficulty, and offers many opportunities for fallacious conclusions. Since the statistician can seldom or never make experiments for himself, he has to accept the data of daily experience, and discuss as best he can the relations of a whole group of changes; he cannot, like the physicist, narrow down the issue to the effect of one variation at a time. The problems of statistics are in this sense far more complex than the problems of physics.

In view of this complexity it will, I think, be generally allowed that the statistical methods hitherto employed are frequently inadequate. No apology therefore is necessary for bringing before the Society a method that, whatever its difficulties, exceeds in completeness and generality any other that covers the same ground.

Few of the results given in the sequel are entirely new, but they have not hitherto been collected together or fully illustrated by numerical examples. The majority have at best found notice in this *Journal* in notices or abstracts of papers by Professor Edgeworth, Mr. Francis Galton, or Professor Pearson.

Before proceeding to the development of formulæ, it may be well to define a few terms that are possibly unfamiliar. The quantities—necessarily *numerical quantities*—whose relations it is desired to investigate will be spoken of as the *variables*, since their magnitude varies. Instead of speaking of "causal relation," "causally related quantities," we will use the terms "correlation," "correlated quantities." This definition is provisional, subject to numerical measures given later.

The ordinary table of double entry which gives the frequency of occurrence of different pairs of two associated or correlated variables will be called a *frequency table* or *correlation table*. The

marriage tables that appear in every Annual Report of the Registrar-General, showing the number of marriages between men and women of different ages, are perhaps the most familiar instances of correlation tables. The different frequencies given in such a table may be represented by verticals of varying height; if the tops of these verticals be joined up, we obtain a *frequency surface* or *correlation surface*, representing the whole table to the eye. The model of Perozzo's Italian marriage surface in the rooms of the Society will be familiar to many members.

Either a column or a row of a correlation table is conveniently called an *array*, the middle value of the variable with which the row is associated being called its *type*, to use two terms introduced by Professor Pearson. Thus, in the Registrar-General's marriage tables, the age-groups run, 25—30, 30—35, 35—40, and so on; the types of rows or columns are consequently, 27·5, 32·5, 37·5, &c. In the general case we may speak of an x-array of type y, or a y-array of type x, the x-arrays being generally understood to be rows, and the y-arrays columns. Such tables of double entry form the basis of our discussion of correlation.

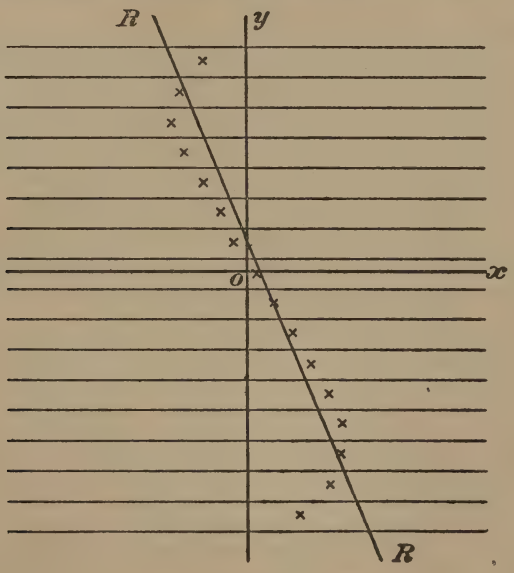

Fig. 1.

Let the diagram of fig. 1[1] represent a general correlation table,

[1] The whole of the first part of the paper up to p. 838 is an expansion, with the addition of worked-out arithmetical examples (pp. 822—831), of a paper by me "On the Significance of Bravais' formulæ for Regression, &c., in the case of Skew Correlation.—"Proceedings Royal Society, 1897," vol. lx, p. 477.

and let the points marked × be the means of successive x-arrays, *e.g.*, in the case we have taken, the mean ages of wives who married husbands of a given age. It is a fact attested by statistical experience that these means do not lie chaotically all over the table, but range themselves more or less closely round a smooth curve, which we will name the *curve of regression*[2] *of x on y*. There is of course a second curve of regression, of y on x, given by the means of the y-arrays. In many cases this curve does not diverge very seriously from a straight line; in a few cases it may be said to be a straight line within the limits of probable error; we will then speak of the *line of regression*. Now suppose that we take a straight line, RR, and fit it to the curve, subjecting the distances of the means from the line to some minimal condition. If the slope of RR be positive, we may say that large values of x are on the whole associated with large values of y. If it is negative, large values of x are associated with small values of y, and *vice versâ*. Further, the slope of RR to the vertical is a measure of a rough practical kind of the shift of the mean of an x-array, corresponding to a given shift of its type y. The equation to the line RR consequently gives a concise and definite answer to two most important statistical questions: Can we say that large values of x are on the whole associated with either large values of y or small values of y? And, What is the average shift of the mean of an x-array corresponding to a shift of unity in its type? If RR be vertical, we may call the two variables *uncorrelated;* so long as it slope to the vertical we may call them correlated. Also, it is evident that if the means of arrays do lie on a straight line, as in the case of normal correlation, discussed in Part II of this paper, RR will be that straight line; *i.e.*, the equation to RR will be the equation to the line of regression. The lines RR we may in general call the characteristic lines.

Let n be the number of correlated pairs, or total frequency, in any x-array, and let d be the horizontal distance of the mean of this array from the line RR. We shall subject the line to the condition that the sum of all quantities like nd^2 shall be a minimum; *i.e.*, we shall use the condition of least squares. This is done solely for convenience of analysis. Using S to denote "the sum of all quantities like" we might make $S(nd)$ a minimum, counting d always as positive or $S(nd^4)$, but the first condition is the easiest to use, gives good results, and is a well known method.

[2] The term regression was introduced by Mr. Galton. He was dealing with the correlation of the heights of sons with their fathers' heights. In this case it is found that the mean height of the sons of parents of a given type is nearer to the mean height of the general population than their parents' height is. That is to say, there is a "stepping back" or "regression" of the sons toward the population-mean.

Now this minimal condition may be regarded from a different point of view. Let O in fig. (1) be the mean of the whole table, *e.g.*, the point corresponding to mean age of husband and mean age of wife, and let us measure our variables not from absolute zero but from O. Let x and y then be a pair of associated deviations, let σ be the standard deviation[3] of any array about its own mean, and let

$$X = a + bY$$

be the equation to RR. Then for any one array[4]

$$S\{x-(a+by)\}^2 = S\{x-(a+bY)\}^2 = n\sigma^2 + nd^2$$

Hence extending the meaning of S to summation over the whole table,

$$S(nd^2) = S\{x-(a+by)\}^2 - S(n\sigma^2).$$

But in this expression $S(n\sigma^2)$ is independent of a and b; it is in fact a characteristic of the table. Therefore making $S(nd^2)$ a minimum is equivalent to making

$$S\{x-(a+by)\}^2$$

a minimum. That is to say, we form a *single valued relation*

$$x = a + by$$

between a pair of associated deviations, such that the sum of the squares of our errors in estimating any one x from its y by the equation is a minimum. This single valued relation, which we may call the characteristic relation, is simply the equation to the line of regression RR. There will be two such equations to be formed corresponding to the two lines of regression.

The idea of the method may at once be extended to the case of correlation between several variables. Let x_1, x_2, x_3, &c., be now a group of associated deviations. Let n be the number of observations in an array of x_1's associated with fixed types X_2, X_3, X_4, &c., of the remaining variables, let σ_1 be the standard deviation of this array, and let d be the difference of its mean from the value given by a regression equation

$$X_1 = a_{11} + a_{12}\,X_2 + a_{13}\,X_3 + a_{14}\,X_4 + \ldots,$$

then as before we shall determine the coefficients a_{11}, a_{12}, &c., so as to make $S(nd^2)$ a minimum. But this is again equivalent to making

$$S\{x_1-(a_{11}+a_{12}\,x_2+a_{13}\,x_3+\ldots)\}^2$$

a minimum, for

$$S\{x_1-(a_{11}+a_{12}\,x_2+a_{13}\,x_3+\ldots)\}^2 = S(n\sigma_1^2) + S(nd^2).$$

[3] Standard deviation = Gauss's "mean error." It is the square root of the mean (deviation)^2 of the array from its mean, *i.e.*, $\sigma^2 = S(x^2)/n$, n being the total frequency of the array.

[4] The second sum in the expression below is the standard deviation of the array about a point differing by $(a + by)$ or d from the mean, and we have used the usual transformation (*cf.* below p. 822).

Hence we may say that we solve for a single valued relation

$$x_1 = a_{11} + a_{12}x_2 + a_{13}x_3 + a_{14}x_4 + \ldots$$

between the associated deviations of our variables; the relation being such that the sum of the squares of the errors made in estimating any one x_1 from its associated x_2, x_3, x_4, &c., is the least possible. We have laid some stress throughout on the fact that the relation is *single valued*, *i.e.*, it gives only one value of x_1 for a given set of values of x_2, x_3, x_4, &c. In actual statistics we know that we will find not one value of x_1 but a whole series, fluctuating round some *mean*. It is this *mean* value that is given by the estimated x_1, to a greater or less degree of approximation, according as the actual regressional relation approximates more or less closely to the linear form. If the regressional relation be *strictly* linear, *i.e.*, if the mean of the array be strictly a linear function of its associated types, then the mean x_1 is given strictly by the characteristic equation.

If we call deviations in excess of the mean positive, and those in defect negative, the characteristic tells us not only *whether a positive or negative* x_1 may on the average be expected for given values of x_2, x_3, x_4, &c., but also *how great* the value of x_1 will be on the average. The method is not only qualitative but also quantitative.

It might appear a more natural proceeding to form a "charac- "teristic relation" between the absolute values of the variables, and not their deviations from the mean, for it is the absolute values that must in general be regarded as related. This may however be most conveniently done by working with the mean as origin until the characteristic is obtained, and then transferring the equation to zero as origin. The work would be much more laborious, and would only lead to the same final result, if zero were used as origin from the commencement. The procedure is illustrated by the arithmetical examples given later on (pp. 822, *et seq.*).

It must be understood that we only take a *linear* characteristic relation because it is the simplest possible form to calculate. We could on precisely the same principles solve for some more general equation such as—

$$\begin{aligned} x_1 = a_{11} \\ &+ a_{12}x_2 + b_{12}x_2^2 + c_{12}x^3{}_2 + \ldots \\ &+ a_{13}x_3 + b_{13}x_3^2 + c_{13}x_3^3 + \ldots \\ &+ a_{14}x_4 + b_{14}x_4^2 + c_{14}x_4^3 + \ldots \\ &+ \ldots\ldots\ldots + \ldots \end{aligned}$$

which would doubtless give the mean of the x_1-array with a greater degree of accuracy. But I think it will be found that

the amount of arithmetic involved in arriving at the linear characteristic for four or five variables will be quite sufficient to content the most enthusiastic statistician. In point of fact few statistics would seem worth the labour of calculating any characteristic more complex than the linear. In most cases the deviation from the linear character, at all events near the middle of the table where frequencies are greatest, does not appear to be very serious even though well defined.

Reviewing briefly the contents of this section, we may say that the present method consists in forming a linear equation between any one variable x_1 of a group, and the other variables x_2, x_3, x_4, &c.; this equation being so formed that the sum of the squares of the errors made in estimating x_1 from its associated variables x_2, x_3, x_4, &c., is the least possible. This relation is termed the characteristic relation. It is evident that if there are n variables, n characteristics can be formed between them, expressing each one in turn in terms of the others. The magnitude and sign of the coefficients of the x's on the right of such an equation show in what direction and to what extent the average of x_1 will be altered when x_2, x_3, x_4, &c., undergo alterations of any given magnitude and sign.

We may now proceed to the detailed discussion of the special cases of two, three, or more variables.

(1) Case of two variables.

Let x and y be a pair of associated deviations measured from the mean X and the mean Y. Then using S to denote summation over the whole series of observations, we have[5]

$$S(x) = S(y) = 0.$$

The characteristic or regression equations which we have to find are of the form

$$\left.\begin{aligned} x &= a_1 + b_1 y \\ y &= a_2 + b_2 x \end{aligned}\right\} \quad \dots \quad \dots \quad \dots \qquad (1)$$

Taking the equation for x first, the two normal equations[6] for determining a_1 and b_1 so that

$$S\{x - (a_1 + b_1 y)\}^2$$

[5] In case this property of the mean may not be familiar, we may prove it. The ordinary definition of the mean is—

$$M = S(X)/N$$

X being the absolute values of the variables. Now measure the X's, not from zero, but from a new origin m, so that

$$X = m + \xi.$$

Then

$$S(X) = m \cdot N + S(\xi)$$
$$M = m + S(\xi)/N.$$

Therefore if m and M are identical, $S(\xi)$ must be zero.

[6] We cannot digress here into the proof of the method for forming the normal equations in the method of least squares, but must refer to the text-books

shall be a minimum, are

$$\left.\begin{aligned} \mathrm{S}(x) &= \mathrm{N}a_1 + b_1\mathrm{S}(y) \\ \mathrm{S}(xy) &= a_1\mathrm{S}(y) + b_1\mathrm{S}(y_2) \end{aligned}\right\} \quad \ldots \quad \ldots \qquad (2)$$

where N is the whole number of observations, or rather of correlated pairs. The first equation gives us at once

$$a_1 = 0.$$

From the second we have

$$b_1 = \frac{\mathrm{S}(xy)}{\mathrm{S}(y^2)}.$$

To simplify our notation let us write

$$\mathrm{S}(x^2) = \mathrm{N}\sigma_1^2. \qquad \mathrm{S}(y^2) = \mathrm{N}\sigma_2^2.$$
$$\mathrm{S}(xy) = \mathrm{N}r\sigma_1\sigma_2.$$

σ_1 and σ_2 are then the two standard deviations or errors of mean square, measuring the degree of scatter of the X's and Y's round their mean values. Rewriting the value of b_1 in terms of these symbols, we have

$$b_1 = r\frac{\sigma_1}{\sigma_2} \qquad \ldots \quad \ldots \quad \ldots \qquad (3)$$

Similarly if we take the second equation, expressing y in terms of x, we get

$$a_2 = 0$$
$$b_2 = r\frac{\sigma_2}{\sigma_1} \qquad \ldots \quad \ldots \quad \ldots \qquad (4)$$

That is to say, the two characteristics are

$$\left.\begin{aligned} x &= r\frac{\sigma_1}{\sigma_2}y \\ y &= r\frac{\sigma_2}{\sigma_1}x \end{aligned}\right\} \quad \ldots \quad \ldots \quad \ldots \qquad (5)$$

Since the two constants on the right hand side have vanished, it follows that the two characteristic lines must both pass through the mean of the whole table.

The standard deviations σ_1 and σ_2 are both essentially positive quantities. The number r may be either positive or negative, according as x's of either signs are generally associated with y's of

(*e.g.*, Merriman's "Method of Least Squares," 6th edit., New York, 1894). The rule may, however, be stated. Let

$$x_0 = a_1x_1 + a_2x_2 + a_3x_3 + \ldots + a_nx_n$$

be an "observation equation." Multiply all through by the coefficient of a_{n-m} (the a's being the unknown constants to be found), and add together all the equations so obtained, giving

$$\begin{aligned} \mathrm{S}(x_0x_{n-m}) = a_1\,&\mathrm{S}(x_1 \cdot x_{n-m}) + a_2\mathrm{S}(x_2 \cdot x_{n-m}) \\ &+ \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \\ &+ a_{n-m}\,\mathrm{S}(x^2{}_{n-m}) + \quad . \quad . \quad . \quad . \\ &+ a_n\mathrm{S}(x_{n-m}x_n) \end{aligned}$$

This is the $(n-m)$th normal equation.

the same or of opposite sign. Hence the numbers b_1 and b_2, that is $r\sigma_1/\sigma_2$ and $r\sigma_2/\sigma_1$, may also be either positive or negative. This is obviously necessary when we remember the physical meaning of the b's; they are measures of the shift of one variable corresponding on an average to a given shift of the other, and these shifts may be either of the same sign or of opposite sign. The b's are conveniently termed the coefficients of regression, or simply the regressions.

It must be noted that if the regression be really linear, *i.e.*, if the curves of regression of fig. 1 become straight lines, the equations (5) are quite strictly the equations to these straight lines; b_1y then gives the mean of the x-array of type y, b_2x gives the mean of the y-array of type x. This theorem admits of a direct and simple geometrical proof. Let n be the total frequency in any one x-array (fig. 2), and let θ be the angle that the line of regression makes with the axis of y. We have to show that

$$\mathrm{AB} = b_1 \,.\, \mathrm{OA},$$

or

$$\tan\theta = b_1 \,.$$

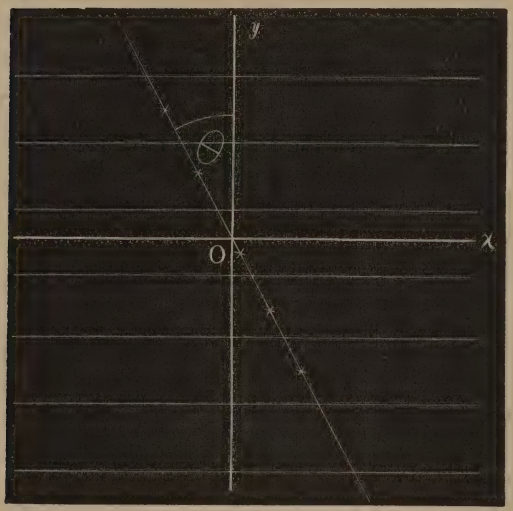

Fig. 2.

We have for a single array

$$\mathrm{S}(xy) = y\mathrm{S}(x) = ny^2 \tan\theta,$$

or extending the significance of S to summation over the whole surface,

$$\mathrm{S}(xy) = \tan\theta \,.\, \mathrm{S}(ny^2) = \tan\theta \,.\, \mathrm{N}\sigma_2^2,$$

that is

$$\tan\theta = \frac{\mathrm{S}(xy)}{\mathrm{N}\sigma_2^2} = r\frac{\sigma_1}{\sigma_2}.$$

Although the regressions may be either positive or negative, they must both have the same sign, viz., the sign of r. This quantity r is most important. Suppose that instead of measuring x and y in arbitrary units, we measure each in terms of its own standard deviation as unit. Then let us write

$$\left(\frac{x}{\sigma_1}\right) = \rho\left(\frac{y}{\sigma_2}\right) \quad \ldots \quad \ldots \quad \ldots \quad (6),$$

and solve for ρ by the method of least squares. We have omitted a constant on the right hand side, since it would vanish as before. We have at once—

$$\frac{S(xy)}{\sigma_1\sigma_2} = \rho\,\frac{S(y^2)}{\sigma_2^2},$$

$$\rho = \frac{S(xy)}{N\sigma_1\sigma_2} = r \quad \ldots \quad \ldots \quad \ldots \quad (7).$$

But r is symmetrical with regard to x and y, that is to say, we would have got the same value for ρ from the equation

$$\left(\frac{y}{\sigma_2}\right) = \rho\left(\frac{x}{\sigma_1}\right)$$

by again using the method of least squares. Hence—*if we measure x and y each in terms of its own standard deviation, r becomes at once the regression of x on y, and the regression of y on x, these two regressions being then identical.*[7]

Again, let us form the sums of the squares of residual errors in equations (5) and (6). Inserting the values of b_1, b_2, and ρ, we get—

$$\left.\begin{aligned} S(x - b_1y)^2 &= N\sigma_1^2(1 - r^2) \\ S(y - b_2x)^2 &= N\sigma_2^2(1 - r^2) \\ S\left(\frac{x}{\sigma_1} - \rho\,\frac{y}{\sigma_2}\right)^2 &= S\left(\frac{y}{\sigma_2} - \rho\,\frac{x}{\sigma_1}\right)^2 = N(1 - r^2) \end{aligned}\right\} \quad \ldots \quad (8).$$

All these quantities, being the sums of series of squares, must necessarily be positive. *Hence, r cannot be numerically greater than unity.* Further, if r be equal to ± 1, all the above three sums become zero. But

$$S\left(\frac{x}{\sigma_1} \pm \frac{y}{\sigma_2}\right)^2$$

can only vanish if

$$\frac{x}{\sigma_1} \pm \frac{y}{\sigma_2} = 0$$

in every case, or if the relation hold good

$$\frac{x_1}{y_1} = \frac{x_2}{y_2} = \frac{x_3}{y_3} = \ldots = \pm\frac{\sigma_1}{\sigma_2} \quad \ldots \quad \ldots \quad (9)$$

[7] This property of r has been used as the fundamental one by Mr. Francis Galton for the case of normal correlation. *Vide* "Correlations and their Measure-" ment."—"Proceedings Royal Society, 1888," vol. xlv, p. 135.

the sign of the last term being the sign of r. That is to say, *when the value of r is unity, all pairs of deviations bear the same ratio to one another, or the values of the two variables are related by a simple linear law.* The ordinary scattered correlation table has collapsed into a distribution of frequency along a straight line. The greater the value of r the more nearly does this theorem hold good, as evidenced by the expression (8). Hence the number r is termed the *coefficient of correlation.* It must be borne in mind that if the true regression be not linear r can never become unity, though we know from experience that it can approach pretty closely to that value. If the regression be very far from linear some caution must evidently be used in employing r to compare two different distributions.[8] When r is unity we may say that the two variables are perfectly correlated, but when it is zero we cannot say that they are strictly uncorrelated, although both regressions are zero. For the fact that $r=0$ does not *in general* imply that the variables are strictly independent in the sense that the chance of getting a given pair of deviations is equal to the product of the chances of getting either separately. The condition $r = 0$ is necessary but is not sufficient.

Referring again to the expressions (8), we see that $\sigma_1\sqrt{1-r^2}$ is the standard error made in estimating x from the characteristic

$$x = r\frac{\sigma_1}{\sigma_2}.y,$$

and similarly $\sigma_2\sqrt{1-r_2}$ is the standard error made in estimating y from the second characteristic

$$y = r\frac{\sigma_2}{\sigma_1}.x.$$

If the form of the correlation be such that the regression is linear, and also the standard deviations of all parallel arrays are equal, then $\sigma_1\sqrt{1-r^2}$ is the standard deviation of every x-array, and $\sigma_2\sqrt{1-r^2}$ is the standard deviation of every y-array. This theorem is of use for the special case of "normal correlation," to be dealt with separately later. To facilitate the calculation of these important quantities we have given in the Appendix (Table I) a table of the values of $\sqrt{1-r^2}$ for values of r progressing by hundredths. This will suffice for most ordinary calculations.

[8] One seems almost to require a generalised correlation coefficient, measuring the approach of the distribution towards a single-valued law *of any form*, for the case of general correlation. It would be easy to get a limit to such a coefficient by finding the standard deviation from the actual line of means.

Examples of the Arithmetical Work Involved in Calculating Standard Deviations, Regressions, and Coefficients of Correlation.

It must be remembered that

$$\sigma_1^2=\frac{S(x^2)}{N} \qquad \sigma_2^2=\frac{S(y^2)}{N} \qquad r=\frac{S(xy)}{N\sigma_1\sigma_2}$$

x and y being deviations measured from their respective means, so that

$$S(x)=0. \qquad S(y)=0.$$

The first thing to be done is consequently to calculate the means. The work for this may often be greatly abbreviated by measuring the variables from an arbitrary origin instead of from zero. Thus let X be the absolute magnitude of any one of the x-variables. Then in the ordinary method of calculating

$$\text{mean X}=\frac{S(X)}{N},$$

N being the total number of them.

But now suppose we measure the X's from an arbitrary origin D, so that

$$X=\xi+D;$$

then

$$S(X)=S(\xi)+N\,.\,D,$$

or

$$\text{mean X}=D+\frac{S(\xi)}{N} \quad \ldots \quad \ldots \quad \ldots \quad \text{(I)}$$

Now let us find the standard deviation round the mean in terms of the standard deviation round the arbitrary origin D Let us write for brevity

$$\frac{S(\xi)}{N}=d.$$

Then if x be as before a deviation from the mean,

$$\xi=x+d,$$

and

$$\begin{aligned} S(\xi^2)&=S(x+d)^2 \\ &=S(x^2)+2dS(x)+Nd^2 \end{aligned}$$

or as $S(x)=0$

$$\frac{S(x^2)}{N}=\frac{S(\xi^2)}{N}-d^2 \quad \ldots \quad \ldots \quad \ldots \quad \text{(II.)}$$

That is, using *sd* as a convenient abbreviation for standard deviation, *the* $(sd)^2$ *round the mean is equal to the* $(sd)^2$ *round any other origin less the square of the distance between the mean and that origin.*

Finally let us take the value of the product sum $S(xy)$. If $\xi\eta$ be the deviations as measured from the arbitrary origin from which the coordinates of the mean are $\bar{x}\,\bar{y}$ (which must of course be given their proper sign),

$$\xi=x+\bar{x}, \quad \eta=y+\bar{y}$$

therefore

$$S(\xi\eta) = S(x+\bar{x})(y+\bar{y})$$

or, expanding and dropping the sums that vanish,

$$S(xy) = S(\xi\eta) - N\overline{xy} \quad \ldots \quad \ldots \quad \text{(III)}$$

As an example of the work let us take the correlation table below,[9] which exhibits the correlation between the per-

Number Relieved Outdoors to One Indoors.	Percentage of Males over 65 in Receipt of Relief.									
	0—5.	5—10.	10—15.	15—20.	20—25.	25—30.	30—35.	35—40.	40—45.	Total.
0— 1.....	0·5	6·0	9·0	1·0	—	—	—	1·0	—	17·5
	9	**6**	**3**	**0**	—	—	—	**12**	—	—
1— 2.....	3·5	13·0	10·0	14·0	5·0	—	—	—	—	45·5
	6	**4**	**2**	**0**	**2**	—	—	—	—	—
2— 3.....	1·0	4·5	13·0	13·5	14·0	2·0	—	—	—	48·0
	3	**2**	**1**	**0**	**1**	**2**	—	—	—	—
3— 4.....	1·0	4·5	7·5	14·0	14·0	3·0	—	—	—	44·0
	0	**0**	**0**	**0**	**0**	**0**	—	—	—	—
4— 5.....	—	1·0	6·0	11·5	8·5	1·0	—	—	—	28·0
	—	**2**	**1**	**0**	**1**	**2**	—	—	—	—
5— 6.....	—	—	3·5	3·0	4·5	2·0	—	—	—	13·0
	—	—	**2**	**0**	**2**	**4**	—	—	—	—
6— 7.....	—	1·0	2·0	1·0	2·0	4·0	1·0	—	—	11·0
	—	**6**	**3**	**0**	**3**	**6**	**9**	—	—	—
7— 8.....	—	0·5	1·0	1·0	3·0	—	—	—	—	5·5
	—	**8**	**4**	**0**	**4**	—	—	—	—	—
8— 9.....	—	0·5	1·0	1·0	1·0	4·0	—	—	—	7·5
	—	**10**	**5**	**0**	**5**	**10**	—	—	—	—
9—10.....	—	1·0	—	2·0	4·0	—	—	—	—	7·0
	—	**12**	—	**0**	**6**	—	—	—	—	—
10—11.....	—	—	—	—	—	—	—	—	—	—
11—12.....	—	—	—	—	2·0	—	—	—	—	2·0
	—	—	—	—	**8**	—	—	—	—	—
12—13.....	—	—	1·0	—	—	—	—	—	—	1·0
	—	—	**9**	—	—	—	—	—	—	—
13—14.....	—	1·0	—	—	—	—	—	—	—	1·0
	—	**20**	—	—	—	—	—	—	—	—
14—15.....	—	—	—	—	—	—	—	—	—	—
15—16.....	—	—	—	1·0	—	1·0	—	—	—	2·0
	—	—	—	**0**	—	**24**	—	—	—	—
16—17.....	—	—	—	—	—	—	—	—	—	—
17—18.....	—	—	—	—	—	1·0	—	—	—	1·0
	—	—	—	—	—	**28**	—	—	—	—
18—19.....	—	—	—	—	1·0	—	—	—	—	1·0
	—	—	—	—	**15**	—	—	—	—	—
Totals	6·0	33·0	54·0	63·0	59·0	18·0	1·0	1·0	—	235·0

[9] "Economic Journal," vol. vi (1896), p. 623, Table VII. I regret to have discovered several errors in completely reworking the nine correlation coefficients of p. 618 of this article. For 0·13 *read* 0·23, for 0·29 *read* 0·25, for 0·40 *read* 0·34. The second error is due to a blunder in standard deviation; for 4·97 *read* 5·75. The third is the present example. None of these errors at all affect the conclusion of the article.

centage of males over 65 in receipt of relief in a certain group of 235 "mostly rural" unions, and the ratio of the number in receipt of out-door to those in receipt of in-door relief. The frequencies[10] given are consequently numbers of unions. It is evident that a slight difficulty in grouping arises if an out-relief ratio happens to work out to a whole number. In such a case that union has to be divided between two rows, and hence the half unions of the table. A union with the out-relief ratio 4, for example, was divided between the rows 3—4 and 4—5, and so on. Exact integral pauperism did not occur, or at all events not so as to affect the table. All the unions in any one compartment of the table are, for the purposes of calculation, assumed to have the out-relief ratio and pauperism corresponding to the centre of that compartment; the fourteen unions, for instance, in row 3—4 Col. 15—20, are assumed to have an out-relief ratio 3·5 and (male) old age pauperism 17·5.

The calculations we will take in the following order—(1) Mean and standard deviation of pauperism. (2) Mean and standard deviation of out-relief ratio. (3) The product-sum and the coefficient of correlation.

The frequencies of the different groups of pauperism are given in the first column of the table below, being taken from the bottom row of the correlation table. The value of pauperism 17·5 per cent. was taken as arbitrary origin, corresponding to the centre of the group with frequency 63, so that ξ for this group is zero. 5 per cent. of pauperism is then taken as the unit, so that the ξ's of successive groups are (+ or −)1, 2, 3, &c. Calling any frequency f, the third column contains the products $f\xi$; multiplying the figures of this column by the ξ's again, we get the products $f\xi^2$.

Mean and Standard Deviation of Pauperism.

1 f.	2 ξ.	3 $f\xi$.	4 $f\xi^2$.
6	− 3	18	54
33	− 2	66	132
54	− 1	54	54
63	0	− 138	
59	+ 1	59	59
18	+ 2	36	72
1	+ 3	3	9
1	+ 4	4	16
235	....	+ 102 − 138	396
		− 36	

[10] The frequencies are the ordinary figures. The *heavy type* figures are only the values of $\xi\eta$, and serve in reckoning $S(xy)$.

Hence

$$S(\xi) = -36. \qquad S(\xi^2) = 396$$

$\therefore$

$$\bar{d} = -\frac{36}{235} = -\cdot1532 \text{ unit}$$
$$= -\cdot766 \text{ per cent.}$$

$\therefore$ Mean pauperism $= 17\cdot5 - \cdot77$
$= 16\cdot73$ per cent.

$$\frac{S(\xi^2)}{N} = \frac{396}{235} = 1\cdot6851$$

$\therefore$

$$\sigma_1^2 = 1\cdot6851 - \bar{d}^2$$
$$= 1\cdot6616$$

$\therefore$

$$\sigma_1 = \sqrt{1\cdot6616} = 1\cdot289 \text{ units,}$$

or

S.D. of pauperism $= 6\cdot445$ per cent.

Proceeding now to the Out-Relief Ratio, and taking the total frequencies from the "Total" column on the right of our correlation-table we get the table below, choosing as origin the group 3 and 4 with frequency 44:—

Mean and Standard Deviation of Out-Relief Ratio.

1	2	3	4
f.	ξ.	$f\xi$.	$f\xi^2$.
17·5	− 3	52·5	157·5
45·5	− 2	91	182
48	− 1	48	48
44	0	− 191·5	....
28	+ 1	28	28
13	+ 2	26	52
11	+ 3	33	99
5·5	+ 4	22	88
7·5	+ 5	37·5	187·5
7	+ 6	42	252
....	+ 7	....	....
2	+ 8	16	128
1	+ 9	9	81
1	+ 10	10	100
....	+ 11	....	....
2	+ 12	24	288
....	+ 13	....	....
1	+ 14	14	196
1	+ 15	15	225
235	....	+ 276·5 − 191·5	2,112
		+ 85	

That is to say we have

$$S(\xi) = +85. \qquad S(\xi^2) = 2112$$

$$\therefore \quad d = +\frac{85}{235} = \cdot 3617$$

$$\therefore \quad \text{Mean out-relief ratio} = 3\cdot 5 + \cdot 36 = \overline{3\cdot 86}$$

$$\frac{S(\xi^2)}{N} = \frac{2112}{235} = 8\cdot 9872$$

$$\therefore \quad \sigma_2{}^2 = 8\cdot 9872 - d^2 = 8\cdot 8564$$

$$\therefore \quad \sigma_2 = \sqrt{8\cdot 8564} = 2\cdot 976$$

As we have grouped by units in this case, this is the standard deviation of the out-relief ratio.

The only work now left is the calculation of the product sum.

The table is now divided into four quadrants by the rows $x = 0$, $y = 0$ (pauperism 15 — 20, and out-relief 3 — 4).

Counting deviations in excess positive, and in defect negative, the products $(\xi\eta)$ will be positive in the upper left hand and lower right hand quadrants, and negative in the two others.

1	2	3	4	5
			$f \times (\xi\eta)$.	
$(\xi\eta)$.	Frequencies.	Total.	Positive.	Negative.
1	8 5 + 13 − 14 − 6	+ 1·5	1·5	....
2	4·5 + 1 + 10 + 4·5	+ 8·5	17	....
	− 2 − 5 − 1 − 3·5	....	....	....
3	2 + 9 + 1 − 2	+ 10	30	....
4	3 + 2 + 13 − 1	+ 17	68	....
5	1 − 1	0	....	....
6	4 + 4 + 6 + 3·5 − 1	+ 16·5	99	....
8	2 − 0·5	+ 1·5	12	....
9	1·5 − 1	+ 0·5	4·5	....
10	4 − 0·5	+ 3·5	35	....
12	− 2	− ·2	....	24
15	+ 1	+ 1	15	....
20	− 1	− 1	....	20
24	+ 1	+ 1	24	....
28	+ 1	+ 1	28	....
Totals	....	....	334	44
			44	
			+ 290	

The whole table must now be gone through, and the value of $(\xi\eta)$ for each compartment entered below its frequency; these figures have been printed in *heavy type* in our table. Finally, all the frequencies of compartments having the same value of $(\xi\eta)$ must be collected together, as in the second column of the table above,

and their sum entered as in the third column, counting as negative the frequencies in the negative quadrants. Finally the products of these "total frequencies" with their corresponding values of $(\xi\eta)$ are formed and entered in Cols. 4 and 5, the positive in 4, and the negative in 5. These two columns are then added up separately and the negative deducted from the positive total, leaving the value of $S(\xi\eta)$ 290 in the present case.

It must be remembered that our units have been throughout the units of grouping. Therefore $\bar{x}$ and $\bar{y}$ (equation III) are $-\cdot1532$ and $+\cdot3617$ respectively. Therefore

$$\begin{aligned} S(xy) &= S(\xi\eta) - N\bar{x}\bar{y} \\ &= 290 + (235 \times \cdot3617 \times \cdot1532 \\ &= 290 + 13\cdot02 = 303\cdot02 \end{aligned}$$

$$\therefore \quad r = \frac{S(xy)}{N\sigma_1\sigma_2} = \frac{303\cdot02}{235 \times 1\cdot289 \times 2\cdot976} = \frac{303\cdot2}{9014\cdot6} = +\cdot336.$$

If we wish to proceed to the determination of the regressions and characteristic equations, we have

Regression of pauperism on out-relief

$$= r\frac{\sigma_1}{\sigma_2} = \cdot336 \times \frac{6\cdot445}{2\cdot976}$$
$$= \cdot728 \text{ per cent.},$$

i.e., the percentage of males over 65 in receipt of relief increases by $\cdot728$, on the average, for every increase of unity in the out-relief ratio.

The characteristic equation between pauperism and out-relief ratio is consequently

$$x = \cdot728y,$$

where x is the deviation of the pauperism from the average, and y the deviation of the out-relief. But if X and Y are the actual values (not deviations)

$$X = x + \text{mean} = x + 16\cdot73$$
$$Y = y + \text{mean} = y + 3\cdot86.$$

Therefore we may write the above

$$(X - 16\cdot73) = \cdot728(Y - 3\cdot86)$$
$$X = 13\cdot92 + \cdot728Y,$$

or in words—

The percentage of males over 65 in receipt of relief = 13·92 per cent. + ·728 times the out-relief ratio.

The average standard deviation of the array of pauperism (from this line of regression), or the standard error made in using

this relation for estimating the pauperism of any union from its out-relief ratio is $\sigma_1\sqrt{1-r^2}$, or,

$$6{\cdot}445\sqrt{{\cdot}8871}$$
$$= 6{\cdot}445 \times {\cdot}9419 = 6{\cdot}071.$$

If the distribution be approximately "normal," the mean error is ·674498 . . . time this, or, 4·095, *i.e.*, one may expect to make an error of 4 per cent. pauperism as often as not.

The second characteristic, between out-relief ratio and pauperism is

$$y = {\cdot}155x;$$

or,

$$(Y - 3{\cdot}86) = {\cdot}155(X - 16{\cdot}73)$$
$$Y = 1{\cdot}27 + {\cdot}155X.$$

This is the relation that would have to be used if it were desired to estimate out-relief ratio from pauperism; it is not of so much interest as the first. The value of $\sigma_2\sqrt{1-r^2}$ is 2·803.

To complete the work we have given (fig. 3) a small

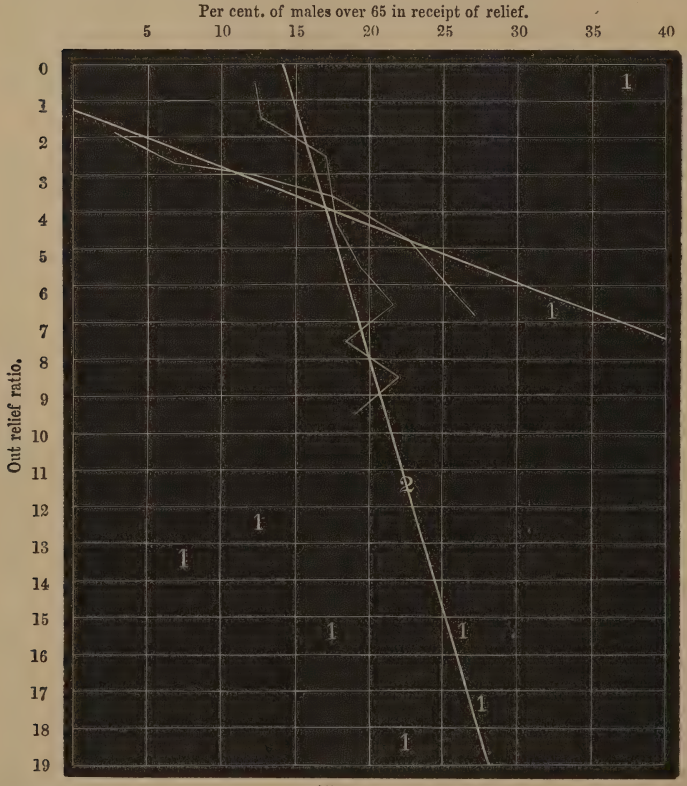

Fig. 3.

Lines of regression (out-relief ratio and pauperism). 235 Unions.

diagram of the lines of regression and the actual means of rows and columns. At the extremities of the figure where there are only one or two observations to an array we have not entered the means, but only the observations. It must be remembered that we have taken an example based on a comparatively small number of observations (235), in order to avoid unwieldy arithmetic in the text, and consequently the results are decidedly irregular.[11]

Unfortunately in practice one has frequently to be content with a much smaller number of observations than two hundred; with so few, in fact, that there is not sufficient material for forming a table of double entry. In this case the form of the arithmetic is somewhat altered. We have thought it worth while to give a special example.

In the table below we have tabulated: (1) the estimated earnings[12] of agricultural labourers in the thirty-eight unions investigated by the Royal Commission on Labour; (2) the pauperism of those unions on 1st January, 1891. Required, to find the correlation between these two quantities, and the regression of pauperism on earnings.

The mean earnings and mean pauperism we have now found by the ordinary straightforward method, adding up Cols. 2 and 3 and dividing the totals by 38.

$$\text{Mean earnings} = \frac{605{\cdot}67}{38} = 15{\cdot}94 \text{ shillings.}$$

$$\text{Mean pauperism} = \frac{139{\cdot}62}{38} = 3{\cdot}67 \text{ per cent.}$$

Having obtained these means, two new columns are formed, giving the deviation of each observation from the mean of its column, taking care to affix to each deviation its proper sign. Thus the numbers in Col. 4 are earnings minus 15·94, and those in Col. 5 pauperism minus 3·67; these deviations are the x's and y's of our previous notation. In Cols. 6 and 7 are entered the squares of the deviations x^2 and y^2, and these two columns are then added up. As we have been working from the mean to a sufficiently close approximation, we have at once without any correction

$$\sigma_1 = \sqrt{\frac{111{\cdot}2997}{38}} = \sqrt{2{\cdot}9289} = 1{\cdot}711 \text{ shillings.}$$

$$\sigma_2 = \sqrt{\frac{63{\cdot}0556}{38}} = \sqrt{1{\cdot}6594} = 1{\cdot}288 \text{ per cent.}$$

Finally in Cols. 8 and 9 are collected the successive

[11] For probable errors of correlation coefficients, see p. 847.

[12] "Earnings from Royal Commission on Labour. The Agricultural Labourer; General Report. By Mr. W. C. Little. [C–6894—xxv] 1894; last column of table on p. 80. Pauperism (percentage of population in receipt of relief of any

products (xy); the negative products in 8 and the positive in 9, so that they can be added up separately. We have finally

$$S(xy) = -55{\cdot}6274.$$

Hence—

$$r = \frac{S(xy)}{N\sigma_1\sigma_2} = -\frac{55{\cdot}6274}{38 \times 1{\cdot}711 \times 1{\cdot}288}$$
$$= -{\cdot}664$$

The regressions are both negative, as r is negative, *i.e.*, high earnings correspond to low pauperism and *vice versâ*, as one would hope. The regression of pauperism on earnings is—

$$r\frac{\sigma_2}{\sigma} = -{\cdot}664 \times \frac{1{\cdot}288}{1{\cdot}711} = -{\cdot}500,$$

i.e., a rise of a shilling in earnings corresponds to a fall of ·5 in average pauperism. Hence the characteristic equation between pauperism and earnings may be written

$$(\text{Pauperism} - 3{\cdot}67) = -{\cdot}5\ (\text{Earnings} - 15{\cdot}94),$$

or

$$\text{Pauperism} = 11{\cdot}64 \text{ per cent.} - {\cdot}5 \text{ earnings in shillings.}$$

The standard error made in estimating the pauperism by this relation is $\sigma_2\sqrt{1-r^2}$, or, interpolating in Table I of the appendix,

$$1{\cdot}288 \times {\cdot}7477$$
$$= {\cdot}96 \text{ per cent. pauperism.}$$

In all work of this kind an arithmometer is of course perfectly invaluable, but in working such an example as the last tables are quicker. Barlow's tables[13] can be used for simply writing down the values of x^2 and y^2, and subsequently for evaluating the square roots. Crelle's[14] multiplication table similarly gives the products (xy) at once by only looking out the factors.

kind) from B Return for 1st January, 1891. We have expressed the estimated earnings in decimals of a shilling; it would have been shorter to have worked in pence throughout, or the last figure might obviously have been omitted.

[13] Barlow's "Tables of Squares, Cubes, Square Roots, Cube Roots, and Reci-" procals of all Integer Numbers up to 10,000." 8vo. (*6s.*) E. and F. N. Spon.

[14] Crelle's multiplication table, giving the products of all numbers up to 1,000 × 1,000. Folio. Nutt, or Williams and Norgate, *21s.*

1 Union.	2 Earnings in Shillings.	3 Pauperism Per Cent.	4 x.	5 y.	6 x^2.	7 y^2.	8 Products. Negative.	9 Products. Positive.
Glendale	20·75	2·40	+4·81	−1·27	23·1361	1·6129	6·1087	....
Wigton	20·25	2·29	+4·31	−1·38	18·5761	1·9044	5·9478	....
Garstang	19·67	1·39	+3·73	−2·28	13·9129	5·1984	8·5044	....
Belper	18·50	1·92	+2·56	−1·75	6·5536	3·0625	4·5800	....
Nantwich	17·67	2·98	+1·73	−0·69	2·9929	0·4761	1·1937	....
Atcham	17·50	1·17	+1·56	−2·50	2·4336	6·2500	3·9000	....
Driffield	17·08	3·79	+1·14	+0·12	1·2996	0·0144	....	0·1368
Uttoxeter	17·00	3·01	+1·06	−0·66	1·1236	0·4356	0·6996	....
Wetherby	17·00	2·39	+1·06	−1·28	1·1236	1·6384	1·3568	....
Easingwold	16·93	2·78	+0·99	−0·89	0·9801	0·7921	0·8811	....
Southwell	16·50	3·09	+0·56	−0·58	0·3136	0·3364	0·3248	....
Hollingbourn	16·33	2·78	+0·39	−0·89	0·1521	0·7921	0·3471	....
Melton Mowbray	16·25	2·61	+0·31	−1·06	0·0961	1·1236	0·3286	....
Truro	16·25	4·33	+0·31	+0·66	0·0961	0·4356	....	0·2046
Godstone	16·00	3·02	+0·06	−0·65	0·0036	0·4225	0·0390	....
Louth	16·00	4·20	+0·06	+0·53	0·0036	0·2809	....	0·0318
Brixworth	15·75	1·29	−0·19	−2·38	0·0361	5·6644	....	0·4522
Crediton	15·67	5·16	−0·27	+1·49	0·0729	2·2201	0·4023	....
Holbeach	15·50	4·75	−0·44	+1·08	0·1936	1·1664	0·4752	....
Maldon	15·50	4·64	−0·44	+0·97	0·1936	0·9409	0·4268	....
Monmouth	15·33	4·26	−0·61	+0·59	0·3721	0·3481	0·3599	....
St. Neots	15·25	1·66	−0·69	−2·01	0·4761	4·0401	....	1·3869
Swaffham	15·00	5·37	−0·94	+1·70	0·8836	2·8900	1·5980	....
Thakeham	15·00	3·38	−0·94	−0·29	0·8836	0·0841	....	0·2726
Thame	15·00	5·84	−0·94	+2·17	0·8836	4·7089	2·0398	....
Thingoe	15·00	4·63	−0·94	+0·96	0·8836	0·9216	0·9024	....
Basingstoke	15·00	3·93	−0·94	+0·26	0·8836	0·0676	0·2444	....
Cirencester	15·00	4·54	−0·94	+0·87	0·8836	0·7569	0·8178	....
North Witchford	14·83	3·42	−1·11	−0·25	1·2321	0·0625	....	0·2775
Pewsey	14·75	5·88	−1·19	+2·21	1·4161	4·8841	2·6299	....
Bromyard	14·75	4·36	−1·19	+0·69	1·4161	0·4761	0·8211	....
Wantage	14·75	3·85	−1·19	+0·18	1·4161	0·0324	0·2142	....
Stratford-on-Avon	14·58	3·92	−1·36	+0·25	1·8496	0·0625	0·3400	....
Dorchester	14·50	4·48	−1·44	+0·81	2·0736	0·6561	1·1664	....
Woburn	14·50	5·67	−1·44	+2·00	2·0736	4·0000	2·8800	....
Buntingford	14·33	4·91	−1·61	+1·24	2·5921	1·5376	1·9964	....
Pershore	13·50	4·34	−2·44	+0·67	5·9536	0·4489	1·6348	....
Langport	12·50	5·19	−3·44	+1·52	11·8336	2·3104	5·2288	....
Totals	605·67	139·62	....	....	111·2997	63·0556	58·3898	2·7624
	....	....	....	....	....	....	2·7624	....
	....	....	....	....	....	....	55·6274	....

(2) Case of Three Variables.

Let the three variables be X_1, X_2, X_3, and let x_1, x_2, x_3, denote deviations of these variables from their respective means. Let us write for brevity, in notation similar to that of the last section,

$$S(x_1^2) = N \cdot \sigma_1^2. \qquad S(x_2^2) = N\sigma_2^2.$$
$$S(x_3^2) = N\sigma_3^2.$$
$$S(x_1x_2) = Nr_{12}\sigma_1\sigma_2. \qquad S(x_2x_3) = Nr_{23}\sigma_2\sigma_3.$$
$$S(x_3x_1) = Nr_{31}\sigma_3\sigma_1.$$

The characteristic or regression equation to be determined will now be of the form—

$$x_1 = b_{12}x_2 + b_{13}x_3 \quad \ldots \quad \ldots \quad \ldots \quad (9)$$

b_{12} and b_{13} being the unknowns to be found from the observations by the method of least squares. A constant term on the right hand side may be at once omitted, since its least square value will be zero as before. The two normal equations for $b_{12}\,b_{13}$ are

$$\begin{aligned} \mathrm{S}(x_1x_2) &= b_{12}\,\mathrm{S}(x_2^{\,2}) + b_{13}\,\mathrm{S}(x_2x_3) \\ \mathrm{S}(x_1x_3) &= b_{12}\,\mathrm{S}(x_2x_3) + b_{13}\,\mathrm{S}(x_3^2) \end{aligned}$$

or, replacing the sums by the symbols defined above, and simplifying,

$$\left.\begin{aligned} r_{12}\sigma_1 &= b_{12}\sigma_2 + b_{13}r_{23}\sigma_3 \\ r_{13}\sigma_1 &= b_{12}r_{23}\sigma_2 + b_{13}\sigma^3 \end{aligned}\right\} \quad \ldots \quad \ldots \quad (10).$$

Whence

$$\left.\begin{aligned} b_{12} &= \frac{r_{12} - r_{13}r_{23}}{1 - r_{23}^{\,2}} \cdot \frac{\sigma_1}{\sigma_2} \\ b_{13} &= \frac{r_{13} - r_{12}r_{23}}{1 - r_{23}^{\,2}} \cdot \frac{\sigma_1}{\sigma_3} \end{aligned}\right\} \quad \ldots \quad \ldots \quad (11).$$

That is, the characteristic relation between x_1 and x_2 x_3 is

$$x_1 = \frac{r_{12} - r_{13}r_{23}}{1 - r_{23}^{\,2}} \cdot \frac{\sigma_1}{\sigma_2}\, x_2 + \frac{r_{13} - r_{12}r_{23}}{1 - r_{23}^{\,2}} \cdot \frac{\sigma_1}{\sigma_2}\, x_3 \quad \ldots \quad (12)$$

There are of course two other characteristic relations of this form, expressing x_2 and x_3 respectively in terms of the remaining pair of variables. The value of any b in terms of the r's can be written down from the expressions (11) by simply interchanging the suffixes. Thus b_{23} could be written down by simply writing 2 for 1 and 3 for 2 all through the expression for b_{12}.

Let

$$v = x_1 - (b_{12}x_2 + b_{13}x_3)\,;$$

i.e., let v be an error made in estimating x_1 from relation (12) or a deviation of x_1 from the value $(b_{12}x_2 + b_{13}x_3)$. Then relation (12) has been so formed that

$$\mathrm{S}(v^2) = \mathrm{S}[x_1 - (b_{12}x_2 + b_{13}x_3)]^2$$

is the least possible. Inserting in this expression the values of b_{12} and b_{13} from (11) we get, after some reduction,

$$\begin{aligned} \mathrm{S}(v^2) &= \mathrm{N}\sigma_1^{\,2}\left(1 - \frac{r_{12}^{\,2} + r_{13}^{\,2} - 2r_{12}r_{23}r_{31}}{1 - r_{23}^{\,2}}\right) \\ &= \mathrm{N}\sigma_1^{\,2}\,(1 - \mathrm{R}_1^{\,2}) \quad \ldots \quad \ldots \quad \ldots \quad (13) \end{aligned}$$

say. Hence $\sigma_1\sqrt{1 - \mathrm{R}_1^{\,2}}$ is the standard error made in estimating x_1 from its associated variables x_2 and x_3 by relation (12).

If we select an array of x_1's for given types, say h_2 and h_3 of x_2 and x_3, then the equation

$$h_1 = b_{12}h_2 + b_{13}h_3$$

will give the mean of this X_1-array, *so long as* h_1 *is really a linear function of* h_2 *and* h_3*; whatever be the distribution of frequency round the means.* If the mean of the x_1-array is not, however, a linear function of its types, the regressional relation will only give its mean to a greater or less degree of approximation. Again, if the standard deviation of all x_1-arrays be equal, as well as the means being linear functions of the types, $\sigma_1\sqrt{1 - R_1^2}$ is the standard deviation of *every array*.

The quantity R_1 is of some interest, as it exactly takes the place of r in the residual-expressions (7). R_1 may in fact be regarded as a coefficient of correlation between x_1 and (x_2, x_3). It can only rise to the value unity if the linear relation (9) or (12) hold good in every single case.

The quantities b_{12}, b_{13}, &c., may be termed the *net* or *partial* regressions of x_1 on x_2, x_1 on x_3, &c. If we write 1 for 2 and 2 for 1 all through the expression for b_{12}, we have

$$b_{21} = \frac{r_{12} - r_{13}r_{23}}{1 - r_{13}^2} \cdot \frac{\sigma_2}{\sigma_1}$$

b_{21} being the net regression of x_2 on x_1.

In correlation of two variables we called the geometrical mean of the regressions the coefficient of correlation. Now we shall call the quantity

$$\rho_{12} = \sqrt{b_{12} \cdot b_{21}} = \frac{r_{12} - r_{13}r_{23}}{\sqrt{(1 - r_{13}^2)(1 - r_{23}^2)}} \quad \ldots \quad (14),$$

where the sign of the root in the denominator is to be taken as positive, the *net* coefficient of correlation[15] between x_1 and x_2. ρ_{12} is the coefficient of correlation for any group of X_1, X_2's associated with a single type of X_3's so long as the conditions hold that the means of all arrays are linear functions of their types. In general correlation where the net coefficient will change as we pass from one type of X_3 to another, ρ_{12} can only retain an average significance. In any case it retains three of the chief properties of the ordinary coefficients; (1) it can only be zero if both net regressions are zero; (2) it is a symmetrical function of the variables (*i.e.*, $\rho_{12} = \rho_{21}$); (3) it cannot be greater than unity; for by (13)

$$r_{12}^2 + r_{13}^2 - 2r_{12}r_{23}r_{31} \text{ is not} > 1 - r_{23}^2,$$

[15] My quantities b_{12} b_{13}, &c., were termed by Professor Pearson ("Regression," &c., "Phil. Trans." A (1896), vol. clxxxvii, p. 287), "coefficients of double regression," and quantities like $b_{12}\,\sigma_2/\sigma_1$, &c., "coefficients of double correlation." The ρ's he did not use. Having named the ρ's net correlations, it seemed most natural to rename the b's net regressions, since the b's and ρ's are corresponding quantities. The expressions $b_{12}\sigma_2/\sigma_1$, &c., are not symmetrical functions of the variables, and may be numerically greater than unity. The quantities like R_1 might well be called coefficients of double correlation.

or adding $r_{13}^2 r_{23}^2$ to both sides, and transferring r_{13}^2 to the right hand side,

$$(r_{12} - r_{13}r_{23})^2 \text{ is not } > (1 - r_{13}^2)(1 - r_{23}^2),$$

that is, the numerator of ρ_{13} cannot be greater than its denominator.

The inequality we have used here is one of considerable interest, since if two coefficients, say r_{12} and r_{13}, be known, it gives us limits for the value of the third. Throwing it into the form

$$(r_{23} - r_{12}\, r_{13})^2 \text{ is not } > 1 + r_{12}^2\, r_{13}^2 - r_{12}^2 - r_{13}^2,$$

we have r_{23} must lie between the limits

$$r_{12}\, r_{13} \pm (\sqrt{1 + r_{12}^2\, r_{13}^2 - r_{12}^2 - r_{13}^2}).$$

The values of these limits for some special cases are collected in the following table :—

Values of r_{12} and r_{13}.	Limits of r_{23}.
$r_{12} = r_{13} = 0$	0
$r_{12} = r_{13} = \pm 1$	$+1$
$r_{12} = +1,\ r_{13} = -1$	-1
$r_{12} = 0,\ r_{13} = \pm 1$	0
$r_{12} = 0,\ r_{13} = \pm r$	$\pm\sqrt{1 - r^2}$
$r_{12} = r_{13} = \pm r$	1 and $2r^2 - 1$
$r_{12} = +r,\ r_{13} = -r$	$2r^2 - 1$ and -1
$r_{12} = r_{13} = \pm\sqrt{0{\cdot}5} = 0{\cdot}707$	0 and 1
$r_{12} = +\sqrt{0{\cdot}5}\ r_{12} = -\sqrt{0{\cdot}5}$	0 ,, -1

One is rather prone to argue that if A be correlated with B, and B with C, A will be correlated with C. But the above table shows that this is quite unnecessary. A may be positively correlated with B, and B positively correlated with C, but yet A may, in general, be negatively correlated with C. Only when the (AB) and (BC) coefficients are both greater than $\sqrt{0{\cdot}5}$ or ·707 . . . can one ascribe the correct sign to the (AC) correlation, and ·707 . . . is an unusually high coefficient in practice.

There is one further point in three-variable correlation that may be cleared up. One expects in general to make a smaller standard error in estimating x_1 from two associated variables x_2 and x_3 than in estimating it from one only, say x_2. But under what conditions is this strictly true? The necessary condition is evidently simply

$$(1 - R_1^2) < (1 - r_{12}^2)$$
$$R_1^2 > r_{12}^2,$$

or

$$r_{12}^2 + r_{13}^2 - 2r_{12}\, r_{13}\, r_{23} > r_{12}^2 - r_{12}^2\, r_{23}^2,$$

or

$$(r_{13} - r_{12}\, r_{23})^2 > 0.$$

But $(r_{13} - r_{12}r_{23})$ is the numerator of ρ_{13}, the net coefficient of

correlation between x_1 and x_3. Hence the standard error in the second case will always be less than in the first so long as ρ_{13} is not zero.

This condition is somewhat interesting, leading, as it does, to unexpected results. To take an arithmetical example, suppose one had in some actual case

$$r_{12} = \pm 0{\cdot}8,$$
$$r_{23} = +0{\cdot}5, \qquad r_{13} = +0{\cdot}4,$$

one might very naturally imagine that the introduction of the third variable with a fairly high correlation-coefficient (0·4) with the first variable, would considerably lessen the standard deviation of the x_1-array, *i.e.*, increase the accuracy of estimation of x_1; but this is not so, for

$$\rho_{13} = \frac{0{\cdot}4 - (0{\cdot}5 \times 0{\cdot}8)}{\sqrt{0{\cdot}75 \times 0{\cdot}36}} = 0,$$

so the third variable would be of no assistance. Again, if $r_{13} = 0$, one cannot conclude that the third variable is of no use, for ρ_{13} will not be zero unless r_{23} also $= 0$.

Little need be said on the carrying out of the arithmetic for the case of three-variable correlation. The three standard deviations σ_1, σ_2, σ_3 must be calculated, and then the three-product sums, giving r_{12}, r_{13}, r_{23}. The net regressions can then be reckoned directly from the expressions (11) and their analogues, or, if preferred, the equations (10) (most simply in their primitive form) may be written down and solved for the b's. The last method is very quick if an arithmometer is available. The net correlation coefficients ρ may also be calculated directly, or, if all six regressions have been already evaluated, may be obtained by using the relations

$$\rho_{12} = \sqrt{b_{12}b_{21}},$$
$$\rho_{13} = \sqrt{b_{13}b_{31}},$$
$$\rho_{23} = \sqrt{b_{23}b_{32}}.$$

Finally, the residual sums like (13) should be obtained, or rather the standard deviations of arrays $\sigma_1\sqrt{1 - R_1^2}$, $\sigma_2\sqrt{1 - R_2^2}$, $\sigma_3\sqrt{1 - R_3^2}$.

All the quantities mentioned will not always be required. The nature of the problem in hand will point to the most suitable form in which to state the results. But in every case the means, standard deviations, and (gross) correlation coefficients r_{12}, r_{13}, r_{23} should be tabulated in a published work, as they enable readers of the paper to evaluate any of the omitted functions for themselves.

(3) Case of Four Variables—general case :—

The general method of procedure in correlation of several variables will have been evident from the last case. We will only

ndicate briefly the results for the case of four variables, which will serve to illustrate the very rapid growth in the complexity of formulæ and arithmetic as the number of variables increases.

If x_1, x_2, x_3, x_4 be associated deviations of the four variables from their respective means, the characteristic equation will be of the form

$$x_1 = b_{12}x_2 + b_{13}x_3 + b_{14}x_4 \quad \ldots \quad \ldots \quad (14).$$

The normal equations for the b's are in our previous notation—

$$\left.\begin{aligned} r_{12}\sigma_1 &= b_{12}\sigma_2 + b_{13}r_{23}\sigma_3 + b_{14}r_{24}\sigma_4 \\ r_{13}\sigma_1 &= b_{12}r_{23}\sigma_2 + b_{13}\sigma_3 + b_{14}r_{34}\sigma_4 \\ r_{14}\sigma_1 &= b_{12}r_{24}\sigma_2 + b_{13}r_{34}\sigma_3 + b_{14}\sigma_4 \end{aligned}\right\} \ldots \quad \ldots \quad (15).$$

Hence

$$b_{12} = \frac{r_{12}(1 - r_{34}^2) + r_{12}(r_{34}r_{24} - r_{23}) + r_{14}(r_{23}r_{34} - r_{24})}{(1 - r_{34}^2) + r_{23}(r_{34}r_{24} - r_{23}) + r_{24}(r_{23}r_{34} - r_{24})} \quad (16),$$

and so on for the others. There are twelve such net-regressions altogether, but all of them will not as a rule be required. As before, we may call

$$\rho_{12} = \sqrt{b_{12}b_{21}} \quad \ldots \quad \ldots \quad \ldots \quad (17)$$

the net coefficient of correlation between x_1 and x_2. There are six such net coefficients, viz., ρ_{12}, ρ_{13}, ρ_{14}, ρ_{23}, ρ_{24}, ρ_{34}. On the assumption of truly linear regression, the ρ's become strictly the coefficients of correlation of the sub-groups, ρ_{12} being the coefficient of correlation for a group of the x_1's and x_2's associated with fixed types of the x_3's and x_4's, and so on.

If we write

$$u = x_1 - (b_{12}x_2 + b_{13}x_3 + b_{14}x_4),$$

we have, after some rather lengthy reduction,

$$\mathrm{S}(u^2) = \mathrm{N}\sigma_1^2(1 - \mathrm{R}_1^2) \quad \ldots \quad \ldots \quad (18),$$

where

$$\mathrm{R}_1^2 = \frac{\left\{\begin{aligned} &r_{12}^2 + r_{13}^2 + r_{14}^2 - r_{12}^2r_{34}^2 - r_{23}^2r_{14}^2 - r_{13}^2r_{24}^2 \\ &- 2(r_{13}r_{14}r_{34} + r_{12}r_{14}r_{24} + r_{12}r_{13}r_{23}) + 2(r_{12}r_{14}r_{23}r_{34} + r_{13}r_{14}r_{23}r_{24} + r_{12}r_{13}r_{24}r_{34}) \end{aligned}\right\}}{1 - r_{23}^2 - r_{34}^2 - r_{24}^2 + 2r_{23}r_{34}r_{24}} \quad (19).$$

Hence, $\sigma_1\sqrt{1 - \mathrm{R}_1^2}$ is the standard error made in estimating x_1 by equation (14) from its associated variables x_2, x_3, and x_4. The quantity R may be considered as a coefficient of correlation, as in the case of three variables. It can only range between the values $\pm$ 1, and can only attain these limiting values if the linear relation (14) hold good in each individual case.

We showed at the end of the last section that the standard error made in estimating x_1 from the relation

$$x_1 = b_{12}x_2 + b_{13}x_3$$

was always less than the standard error when only x_2 was taken into account unless

$$\rho_{13} = 0.$$

We may now prove the similar theorem that where three variables are used on which to base the estimate, the standard error will be again decreased unless

$$\rho_{14} = 0.$$

The condition that $S(u^2)$ in the present case shall be less than $S(v^2)$ in the last is in fact

$$\left\{\begin{array}{l} r_{12}^2 + r_{13}^2 + r_{14}^2 - r_{12}^2 r_{34}^2 - r_{23}^2 r_{14}^2 - r_{13}^2 r_{24}^2 \\ -2(r_{13}r_{14}r_{34} + r_{12}r_{14}r_{24} + r_{12}r_{13}r_{23}) \\ +2(r_{12}r_{14}r_{23}r_{34} + r_{13}r_{14}r_{23}r_{24} + r_{12}r_{13}r_{24}r_{34}) \end{array}\right\}(1 - r_{23}^2)$$
$$> (r_{12}^2 + r_{13}^2 - 2r_{12}r_{13}r_{23})(1 - r_{23}^2 - r_{24}^2 - r_{34}^2 + 2r_{23}r_{24}r_{34}).$$

This may be finally reduced to

$$(r_{14} - r_{13}r_{34} - r_{12}r_{24} - r_{14}r_{23}^2 + r_{13}r_{23}r_{24} - r_{12}r_{23}r_{34})^2 > 0,$$

or,

$$\rho_{14}^2 > 0,$$

which proves the theorem. In practically working out a case of four-variables correlation, the *six* correlation tables (12, 13, 14, 23, 24, 34) have first to be formed, and the four standard deviations and six product sums calculated. In most cases all the four regression equations will not be required, but only one or two. If this be the case, it will probably be quickest simply to write down the equations (15) and solve them straightforwardly for the b's, without using the general solutions like (16). Similarly, it may be quicker to evaluate $S(u^2)$ in the elementary form.

$$\left\{\begin{array}{l} S(x_1^2) + b_{12}S(x_2^2) + b_{13}S(x_3^2) + b_{14}S(x_4^2) \\ -2b_{12}S(x_1x_2) - 2b_{13}S(x_1x_3) - 2b_{14}S(x_1x_4) \\ +2b_{12}b_{13}S(x_2x_3) + 2b_{12}b_{14}S(x_2x_4) + 2b_{13}b_{14}S(x_3x_4) \end{array}\right\} \quad (20),$$

instead of using the general expressions (18) and (19) in terms of the r's.

It is important to notice this last step because the general formula in the form of (19) may be difficult to arrive at in the cases of more variables than four, whereas there is never any difficulty in writing down the elementary form above. In the general cases of n variables there will be n means and standard deviations to be reckoned; and as many tables to be formed and product sums calculated as there are numbers of combinations of n things two together, or

$$\frac{n(n-1)}{2}.$$

Thus the amount of labour involved grows very rapidly with

the number of variables taken into account, as is illustrated by the following table :—

Number of Variables.	Number of Correlation Coefficients.
2	1
3	3
4	6
5	10
6	15
7	21
8	28

Thus if we wished to discuss the causality of pauperism on the basis of as many as eight variables, the work involved would be something like *twenty-eight times* as much as that necessary for the example taken on pp. 824—831. The labour would, in fact, be almost impossible for a single individual. Hence the remark in the introduction (p. 817), that "the labour involved in arriving at "the linear characteristic for four or five variables, will be quite "sufficient to content the most enthusiastic statistician," without attempting to obtain any more complex form of regressional relation.

When the coefficients of correlation and standard deviations have been obtained, the general equations may be written down in the form (15) and solved for the b's. There is no further difficulty in the general case save that arising from the length of arithmetic.

We may note that although the sum of squares of residuals, $S(u^2)$ or the standard deviation of the array will in general get less and less the more variables we introduce, the decrease may be very slight, although the (gross) correlation coefficients $r_{12}\,r_{13}$, &c., are all large. The condition for the decrease is, as we have pointed out and exemplified (pp. 834 and 837), that the *net correlations* should not be zero. But the net correlations may well be zero (or very small) even though the r's are large.

Professor Pearson points out to me that as a limiting case the standard deviation of the array may vanish. In the case of two variables for instance Σ_1 will vanish if (*vide* (13))

$$r_{12}^2+r_{13}^2+r_{23}^2=1+2r_{12}r_{13}r_{23}$$

If the left hand side is greater than the right Σ_1 becomes imaginary, so the condition is a limiting one. Evidently however it is a desirable condition to approximate to if the regression equation is to be used for estimating.[16]

[16] The property is actually made use of in a Paper by Professor Pearson and Miss Lee, now printing for the Phil. Trans., for estimating the barometric height at one station from a knowledge of its value at two others. The estimate may be made extremely accurate by a proper choice of stations.

II. *On Normal Correlation.*[17]

(1.) Case of Two Variables.

In the whole of the preceding work we have made no postulates as to the form of the distribution of frequency. The whole problem lay in obtaining the characteristic relation and its interpretation.

But the much more general problem of obtaining an expression completely describing the frequency-distribution is one that may sometimes become of importance. It has only been solved for the case corresponding to the "normal curve" in the distribution of a single variable.

Suppose the distribution of one variable X_1 round its mean to be given by the normal curve

$$y = y_0 e^{-\frac{x_1^2}{2\sigma_1^2}} \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where σ_1 is the standard deviation of the variable, and x_1 a deviation from the mean. Similarly, suppose the distribution of a second variable x_2 to be given by

$$y' = y_0' e^{-\frac{x_2^2}{2\sigma_2^2}} \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Then, *if* X_1 *and* X_2 *be uncorrelated*, the chance of a pair of observed deviations lying between $x_1 - \frac{1}{2}\delta x_1$, $x_1 + \frac{1}{2}\delta x_1$ and $x_2 - \frac{1}{2}\delta x_2$, $x_2 + \frac{1}{2}\delta x_2$ must be proportional to

$$z = y_0 y_0' e^{-\frac{1}{2}\left(\frac{x_1^2}{\sigma_1^2} + \frac{x_2^2}{\sigma_2^2}\right)} \quad \ldots \quad \ldots \quad (3)$$

This is what we may term a special case of normal correlation surface, the correlation being nil. If x_1 and x_2 be taken as coordinates in the horizontal plane, the contour lines of the surface are the similar and similarly situated ellipses

$$\frac{x_1^2}{\sigma_1^2} + \frac{x_2^2}{\sigma_2^2} = \text{const.}$$

Any section of the surface taken by a vertical plane parallel to the x_1 axis (*i.e.*, the distribution of any x_1-array) is of the form

$$z = z_0 e^{-\frac{x_1^2}{2\sigma_1^2}}$$

and is consequently a normal curve of standard deviation σ_1, the mean lying on the x_1 axis. Similar statements hold of course for sections parallel to the x_2 axis. The elliptic contour lines lie in fact as in fig. 4.

[17] The first discussion of the normal theory of frequency for more than one variable was given by Bravais ("Mémoires présentés par Divers Savants," ix, 1846).

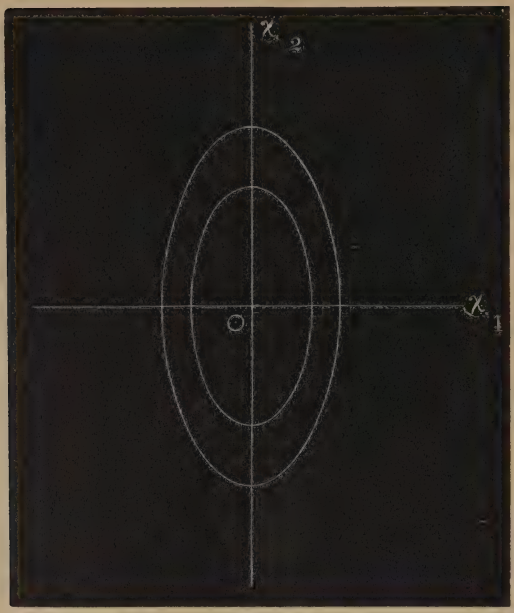

Fig. 4.

But the two variables X_1 X_2 will not, in general, be independent, and we cannot take the chance of getting a given pair of

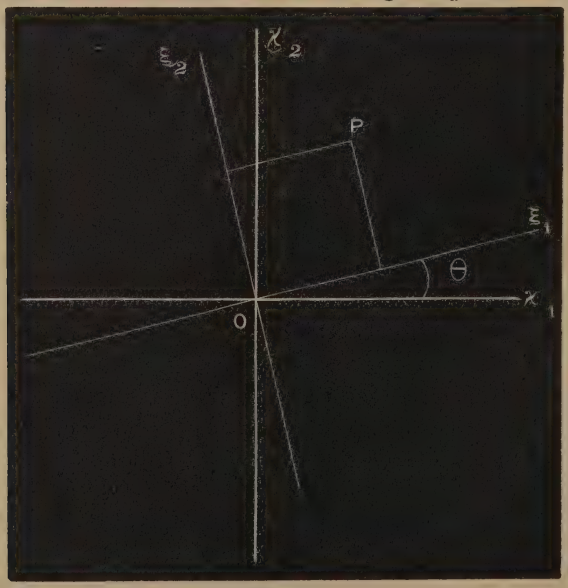

Fig. 5.

deviations to be the product of the chances of getting either separately. To illustrate what may happen in this case, suppose that having got the normal surface for x_1 and x_2, we now take a new pair of rectangular axes $O\xi_1$, $O\xi_2$, making an angle θ with the first pair, and suppose deviations to be now measured from these axes (fig. 5). Then our new variables ξ_1 and ξ_2 are connected with the old by the relations

$$\xi_1 = x_1 \cos\theta + x_2 \sin\theta$$
$$\xi_2 = x_2 \cos\theta - x_1 \sin\theta$$

and hence ξ_1 and ξ_2 *are not independent*, both being functions of x_1 and x_2. Using the converse transformation equations,

$$\left.\begin{aligned} x_1 &= \xi_1 \cos\theta - \xi_2 \sin\theta \\ x_2 &= \xi_1 \sin\theta + \xi_2 \cos\theta \end{aligned}\right\},$$

the frequency surface becomes

$$z = z_0 e^{-\left\{ \frac{(\xi_1 \cos\theta - \xi_2 \sin\theta)^2}{2\sigma_1^2} + \frac{(\xi_1 \sin\theta + \xi_2 \cos\theta)^2}{2\sigma_2^2} \right\}},$$

or, reducing, the surface is of the form

$$z = z_0 e^{-(g_1\xi_1^2 + g_2\xi_2^2 - 2h\xi_1\xi_2)} \quad \ldots \quad \ldots \quad (4),$$

i.e., it differs from the uncorrelated surface by the introduction of the product term $\xi_1\,\xi_2$ into the exponent.

The values of g_1 g_2 and h can be obtained without the use of the calculus from the work in Part I. The distribution of an array of type t is given by

$$z = z_0 {}' e^{-(g_1\xi_1^2 + g_2 t^2 - 2ht\xi_1)},$$

or transforming the exponent into a perfect square,

$$z = z_0 {}' e^{-g_1\left\{\xi_1 - \frac{ht}{g_1}\right\}^2} \quad \ldots \quad \ldots \quad (5)$$

This is a normal distribution, the mean of which differs by ht/g_1 from the mean of the whole surface, with a standard deviation $1/\sqrt{2g_1}$. It follows that (1) the deviation of the mean of the array, is directly proportional to the type, or the regression is truly linear; (2) the standard deviations of all parallel arrays are equal and independent of their types. Hence if we write

$$\mathrm{S}(\xi_1^2) = \mathrm{N} \,.\, c_1^2,$$
$$\mathrm{S}(\xi_2^2) = \mathrm{N} \,.\, c_2^2,$$
$$\mathrm{S}(\xi_1\xi_2) = \mathrm{N} \,.\, rc_1c_2,$$

it follows directly from the formulæ for general correlation that

$$\frac{1}{2g_1} = c_1^2(1 - r^2)$$

or

$$g_1 = \frac{1}{2c_1^2(1 - r^2)} \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

and

$$\frac{h}{g_1} = r\frac{c_1}{c_2}$$

$$h = \frac{1}{2c_1{}^2(1-r^2)}\, r\frac{c_1}{c_2}$$

$$= \frac{r}{2c_1c_2\,(1-r^2)} \quad \ldots \quad \ldots \quad \ldots \quad (7)$$

By symmetry

$$g_2 = \frac{1}{2c_2{}^2\,(1-r^2)} \quad \ldots \quad \ldots \quad \ldots \quad (8)$$

Hence the equation to the frequency surface may be written in the form

$$z = z_0 e^{-\left\{\frac{\xi_1{}^2}{2c_1{}^2\,(1-r^2)} + \frac{\xi_2{}^2}{2c_2{}^2\,(1-r^2)} - \frac{r\xi_1\xi_2}{c_1c_2\,(1-r^2)}\right\}} \quad (9)$$

where c_1 and c_2 are the S.D.'s of ξ_1 and ξ_2, and r is the coefficient of correlation between them. This then is the general form of normal correlation between two dependent variables ξ_1 and ξ_2. The most important properties of such a surface we have already mentioned, viz. :—

(1.) Not only must the total distributions of the two variables ξ_1 and ξ_2 be normal, but the distribution of every array must also be normal.

(2.) The regressions are truly linear, *i.e.*, the means of parallel arrays lie on straight lines.

(3.) The standard deviations of all parallel arrays are equal.

(4.) The contour lines are a system of similar and similarly situated ellipses, the centres coinciding with the mean of the whole surface.

The accompanying figure (6) shows the form of the contour lines. M M′ M M′ are the two lines of means or lines of regression, the equations to which, in the notation of Part I, are of the form

$$x = r\frac{\sigma_1}{\sigma_2}y \qquad\qquad y = r\frac{\sigma_2}{\sigma_1}x.$$

The two lines of regression are conjugates respectively to the horizontal and vertical.

The axes coinciding with the major and minor axes of the ellipses are termed the *principal axes* of the surface. But with reference to the principal axes the coefficient of correlation is zero. Hence, if $x_1\, x_2$ be two *correlated* variables with S.D.'s $\sigma_1\, \sigma_2$, it follows that we can always determine two new variables,

$$ax_1 + bx_2$$
$$cx_1 - dx_2$$

that are *uncorrelated*, by simply referring the surface to its principal

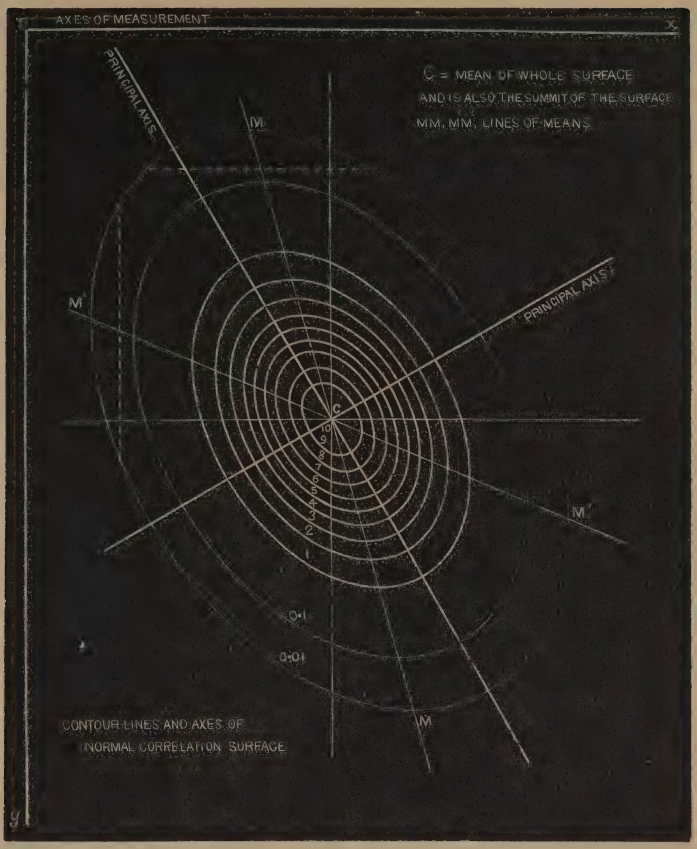

Fig. 6.

axes; if in fact the principal axes make an angle θ with the axes of measurement,

$$X_1 = x_1 \cos\theta + x_2 \sin\theta$$
$$X_2 = x_2 \cos\theta - x_1 \sin\theta$$

are uncorrelated. Professor Edgeworth[18] has recently proposed to turn these "uncorrelated functions" to practical account, for convenience in sorting anthropometric measurements. The angle θ is given by

$$\tan 2\theta = \frac{2r\sigma_1\sigma_2}{\sigma_1^2 - \sigma_2^2}$$ [19] ... ... (9),

[18] *Journal of the Royal Statistical Society.* Vol. lix, 1896, p. 534.

[19] This may be proved thus: Multiply together the two transformation equations above. This gives

$$X_1X_2 = (x_2^2 - x_1^2)\frac{\sin 2\theta}{2} + x_1x_2\cos 2\theta.$$

where $\sigma_1 \sigma_2$ are the S.D.'s of the correlated variables, and r their correlation coefficient.

The coefficient of correlation with reference to principal axes being zero, and with reference to other axes *something*, there must be some pair of axes for which r is a maximum. r^2 is in fact greatest, or r numerically greatest without regard to sign, for those axes that make 45° with the principal axes.

To complete the numerical data for the normal surface we require the value of z_0, the ordinate of the surface at the mean, or the maximum ordinate. This will be found by integrating out the volume of the surface and equating to the total frequency N. Its value is

$$z_0 = \frac{N}{2\pi\sigma_1\sigma_2\sqrt{1-r^2}} \quad \ldots \quad \ldots \quad (10).$$

Suppose Σ_1 and Σ_2 to be the standard deviations of the given distribution *about the principal axes.* If σ_1 σ_2 are known Σ_1 and Σ_2 may be also taken as known, since by the equations just quoted above for transforming coordinates,

$$X_1^2 + X_2^2 = x_1^2 + x_2^2$$

and therefore, summing,

$$\Sigma_1^2 + \Sigma_2^2 = \sigma_1^2 + \sigma_2^2 \quad \ldots \quad \ldots \quad (11)$$

Again, from the converse transformation equations,

$$\sigma_1^2 - \sigma_2^2 = (\Sigma_1^2 - \Sigma_2^2) \cos 2\theta.$$

Squaring, and eliminating θ from (9).

$$\Sigma_1^4 + \Sigma_2^4 - 2\Sigma_1^2\Sigma_2^2 = \sigma_1^4 + \sigma_2^4 - 2\sigma_1^2\sigma_2^2(1-2r^2).$$

Squaring (11) and subtracting this equation from it,

$$\Sigma_1^2\Sigma_2^2 = \sigma_1^2\sigma_2^2(1-r^2) \ldots \quad \ldots \quad \ldots \quad (12).$$

(11) and (12) determine Σ_1, Σ_2 given $\sigma_1\sigma_2$. Hence, referring the surface to its principal axes, the expression for the frequency may be written

$$F = \frac{N}{2\pi\Sigma_1\Sigma_2} e^{-\frac{1}{2}\left(\frac{X_1^2}{\Sigma_1^2} + \frac{X_2^2}{\Sigma_2^2}\right)} \quad \ldots \quad \ldots \quad (13).$$

Any elliptic contour line is given by

$$\frac{X_1^2}{\Sigma_1^2} + \frac{X_2^2}{\Sigma_2^2} = c^2,$$

Now sum, remembering

$$S(X_1X_2) = 0, \; S(x_1x_2) = Nr\sigma_1\sigma_2,$$

and we have

$$0 = (\sigma_2^2 - \sigma_1^2)\frac{\sin 2\theta}{2} + r\sigma_1\sigma_2 \cos 2\theta.$$

Therefore

$$\tan 2\theta = \frac{2r\sigma_1\sigma_2}{\sigma_1^2 - \sigma_2^2}.$$

c being a constant. Let us find the total frequency between two adjacent ellipses c, and $c + \delta c$. The area between the two is

$$\pi\Sigma_1\Sigma_2\{(c+\delta c)^2-c^2\}$$
$$=2\pi\Sigma_1\Sigma_2 c\,.\,\delta c\,.$$

Hence the total frequency contained on the element is

$$Nc\,.\,\delta c\,.\,e^{-\frac{1}{2}c^2}$$

Hence the total frequency contained *inside* the ellipse c is

$$N\int_0^c c\,.\,e^{-\frac{1}{2}c^2}\,dc = N\Big[-e^{-\frac{1}{2}c^2}\Big]_0^c$$

or

$$N\left(1-e^{-\frac{1}{2}c^2}\right).$$

Hence the probability that an observation lie *outside* the ellipse c is

$$e^{-\frac{1}{2}c^2},$$

a quantity that is given by any of the ordinary tables of the exponential function, or the small table below.[20] This theorem is due to Bravais, *loc. cit.*, on p. 839, note 17.

c.	$e^{-\frac{1}{2}c^2}$.	c.	$e^{-\frac{1}{2}c^2}$.
0·0	1	3·2	0·0060
0·2	0·9802	3·4	0·0031
0·4	0·9231	3·6	0·0015
0·6	0·8353	3·8	0·00073
0·8	0·7262	4·0	0·00034
1·0	0·6065	4·2	0·00015
1·2	0·4868	4·4	0·000062
1·4	0·3753	4·6	0·000028
1·6	0·2780	4·8	0·000011
1·8	0·1979	5·0	0·0000037
2·0	0·1353	5·2	0·0000013
2·2	0·0889	5·4	0·00000047
2·4	0·0561	5·6	0·00000015
2·6	0·0340	5·8	0·000000050
2·8	0·0198	6·0	0·000000015
3·0	0·0111		

The ellipse $c=1$, whose axes are Σ_1 and Σ_2, may be called the "standard ellipse." It very nearly coincides with contour line 6 of the plate, since

$$e^{-\frac{1}{2}}=\cdot6053\ldots$$

The ellipse for which

$$e^{-\frac{1}{2}c^2}=0\cdot5$$
$$c=1\cdot17741\ldots$$

may be called (by analogy from the term "probable error") the "probable ellipse," or better the quartile ellipse. It is ellipse 5

[20] Extended from a set of tables issued by Professor Karl Pearson in 1893 for his Gresham Lectures on Chance.

of the figure. In the diagram of figure (6) in fact 10 per cent. of the whole frequency lies outside ellipse 1, 20 per cent. outside ellipse 2, and so on.

Only about 1 per cent. of the whole frequency lies outside the ellipse $c=3$, for which

$$e^{-\frac{1}{2}c^2}=0{\cdot}0111\ \ldots$$

Consequently this ellipse will, roughly speaking, cover the whole range of small series of observations.

Various Values of the Correlation Coefficient.

All through the present section we have used the value of r obtained by the method of least squares in Sec. I, viz. :—

$$r = \frac{\mathrm{S}(xy)}{\mathrm{N}\sigma_1\sigma_2}, \qquad \ldots \qquad \ldots \qquad \ldots \qquad \text{(A)}$$

but it is evident that if the correlation surface be strictly normal r may be evaluated in many other ways; *e.g.*, the S.D. of an array, σ'_1, may be calculated and compared with the S.D. σ_1 of the totality of such arrays, when we have

$$\sigma'_1{}^2 = \sigma_1{}^2(1 - r^2),$$

or,

$$r^2 = 1 - \frac{\sigma'_1{}^2}{\sigma_1{}^2} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \text{(B)},$$

Or, again, the mean of an array of type x may be found, whence, if the deviation of its mean be $\bar{y}$,

$$\bar{y} = r\frac{\sigma_2}{\sigma_1}x\,.$$

$$r = \frac{\sigma_1}{\sigma_2} \times \frac{\bar{y}}{x} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \text{(C)}.$$

The question may consequently be put, what is the best value to give r, *i.e.*, what value of r will make the probability of an observed set of deviations a maximum? The value (A) of r was given by Bravais[21] in 1846; it has recently been shown to be the best value by Professor Pearson.[22] Thus, let $(x_1\,y_1)$, $(x_2\,y_2)$, &c., be a series of observed deviations. The chance of one pair occurring varies as

$$\frac{1}{\sqrt{1-r^2}}e^{-\frac{1}{2(1-r^2)}\left\{\frac{x_1^2}{\sigma_1^2}+\frac{y_1^2}{\sigma_2^2}-\frac{2x_1y_1r}{\sigma_1\sigma_2}\right\}}$$

or the chance of the whole system occurring varies as the product of all such quantities, that is

$$\frac{1}{(1-r^2)^{n/2}}e^{-\frac{1}{2(1-r^2)}\left\{\frac{\mathrm{S}(x^2)}{\sigma_1^2}+\frac{\mathrm{S}(y^2)}{\sigma_2^2}-\frac{2\mathrm{S}(xy)\,.\,r}{\sigma_1\sigma_2}\right\}}$$

[21] "Mémoires présentés par divers Savants," IIe Série, ix, 1846.
[22] "Phil. Trans." (A), vol. clxxxvii, p. 253, 1896.

Remembering

$$\sigma_1^2 = \mathrm{S}(x^2)/n, \qquad \sigma_2^2 = \mathrm{S}(y^2)/n,$$

and writing

$$\frac{\mathrm{S}(xy)}{n\sigma_1\sigma_2} = p,$$

this quantity becomes

$$\frac{1}{(1-r^2)^{n/2}} e^{-n\frac{1-pr}{1-r^2}}$$

The differential of the logarithm of this with regard to r is

$$\frac{n(1+r^2)\ (p-r)}{(1-r^2)^2},$$

and equating it to zero gives at once

$$r = p$$

as the best value of r, that is Bravais's value is the best.

Probable Errors.

Professor Pearson next proceeds, in the paper cited, to evaluate the probable error of r, and arrives at the result

$$\text{probable error of } r = \cdot 674489.. \frac{1-r^2}{\sqrt{n(1+r^2)}}.$$

This value, he has recently concluded, is slightly in error, being only the probable error of an array of r's corresponding to given values of, σ_1 σ_2. The corrected value is[23]

$$\text{probable error of } r = \cdot 674489.. \frac{1-r^2}{\sqrt{n}}.$$

The difference from the first value given is always small, and vanishes altogether for $r = 0$ and $r = 1$. In Table I at the end will be found the values of $(1 - r^2)$ for all values of r increasing by hundredths, and in Table II is given a table of the actual probable errors for values of r rising by tenths, and values of n 25, 50, 75, 100, 200, &c., to 1,000 From the table can be seen by inspection the approximate probable error of any correlation coefficient where the number of observations does not exceed 1,000.

In the case of normal variation the probable error of the mean is

$$\cdot 674489.. \frac{\sigma}{\sqrt{n}}.$$

and the probable error of the standard deviation

$$\cdot 674489.. \frac{\sigma}{\sqrt{2n}}$$

These are all the probable errors concerned.

[23] "On the probable errors of Frequency Constants," &c., by Prof. Karl Pearson, F.R.S., and L. N. G. Filon, B.A., Abstract in Proceedings, Royal Society. Read 18th October, 1897. An important paper by Mr. W. F. Sheppard bearing partly on probable errors was also read at the same meeting.

(2.) Case of Three Variables.

We contented ourselves, in the preceding case, with giving a deduction of the general expression for the normal frequency surface based solely on a transformation of coordinates from the case of "no correlation" ($r = 0$). This proceeding was of course a suggestive artifice and not a strict proof; there may not always be two directions of independent variation such as were practically postulated. The same method may however be employed to *suggest* the "normal surface" for correlation of n variables; it will lead simply to the general form

$$\text{frequency} = \text{const.} \times e^{-(\text{general quadratic function of the variables})}.$$

In the case of three variables, for example, the exponent is (dropping the minus sign),

$$g_1x_1^2 + g_2x_2^2 + g_3x_3^2 - 2h_1x_2x_3 - 2h_2x_1x_3 - 2h_3x_1x_2.$$

The g's and h's can be determined as in the last case from the work in Part I.

Taking special types of x_2 and x_3, the standard deviations of the x_1-array is $1/\sqrt{2g_1}$, and so on for the others. Hence writing for brevity

$$\Delta = 1 - r_{12}^2 - r_{23}^2 - r_{13}^2 + 2r_{12}r_{23}r_{13},$$

we have

$$\left.\begin{aligned} g_1 &= \frac{1 - r_{23}^2}{2\Delta\sigma_1^2} \\ g_2 &= \frac{1 - r_{13}^2}{2\Delta\sigma_2^2} \\ g_3 &= \frac{1 - r_{12}^2}{2\Delta\sigma_3^2} \end{aligned}\right\}$$

To find the values of the h's, let t_2 and t_3 be the types assigned to x_2 and x_3. Then the distribution of the x_1-array is of the form

$$\begin{aligned} z &= z_0' e^{-g_1\left\{x_1^2 - \frac{2}{g_1}x_1(h_2t_3 + h_3t_2)\right\}} \\ &= z_0'' e^{-g_1\left(x_1 - \frac{h_2t_3 + h_3t_2}{g_1}\right)^2} \end{aligned}$$

The regression is, as before, truly linear, the mean of the x_1-array differing from the mean of all x_1's by the quantity

$$\frac{h_2t_3 + h_3t_2}{g_1}.$$

Hence, putting $t_2 = 0$, we have at once (part I, (2), p. 832)

$$\frac{h_2}{g_1} = b_{13} = \frac{r_{13} - r_{12}r_{23}}{1 - r_{23}^2} \cdot \frac{\sigma_1}{\sigma_3}.$$

Therefore

$$\begin{aligned} h_2 &= \frac{r_{13} - r_{12}r_{23}}{1 - r_{23}^2} \cdot \frac{1 - r_{23}^2}{2\Delta\sigma_1^2} \cdot \frac{\sigma_1}{\sigma_3} \\ &= \frac{r_{13} - r_{12}r_{23}}{2\Delta\sigma_1\sigma_3} \end{aligned}$$

Similarly

$$h_3 = \frac{r_{12} - r_{13}r_{23}}{2\Delta\sigma_1\sigma_2}$$

$$h_1 = \frac{r_{23} - r_{12}r_{13}}{2\Delta\sigma_2\sigma_3}.$$

Finally, the constant outside the exponential, or the maximum ordinate, will be required. Its value is found as before by integrating out the whole volume of the surface and equating to the total frequency N, which gives

$$\frac{N}{(2\pi)^{3/2}\sigma_1\sigma_2\sigma_3\sqrt{\Delta}}.$$

In the case of two variables the whole frequency-distribution could be represented by a family of similar and similarly situated ellipses; in the present case we must take a family of similar and similarly situated ellipsoids. Just as in the former case we could refer the *ellipses* to their principal axes, so in this case we can refer the *ellipsoids* to their principal axes. Since the product-terms in the exponent must vanish for these axes, we must have

$$r_{23} = r_{12}r_{13},$$
$$r_{13} = r_{12}r_{23},$$
$$r_{12} = r_{13}r_{23}.$$

From the first two of these equations

$$r_{13}r_{23} = r_{12}^2 r_{13}r_{23},$$

and from the last

$$r_{12} = r_{13}r_{23},$$

which can only be satisfied by

$$r_{12} = r_{13} = r_{23}\,0 \text{ or } 1.$$

But the first is the only admissible solution (as for the second Δ becomes zero), so that there is no correlation round the principal axes. Hence three linear functions of x_1, x_2, x_3, can always be formed between which the correlation is zero.

If the surface be referred to its principal axes the equation to it is

$$F = \frac{N}{(2\pi)^{3/2}\Sigma_1\Sigma_2\Sigma_3}\, e^{-\frac{1}{2}\left\{\frac{X_1^2}{\Sigma_1^2} + \frac{X_2^2}{\Sigma_2^2} + \frac{X_3^2}{\Sigma_3^3}\right\}}$$

The volume of the ellipsoid

$$\frac{X_1^2}{\Sigma_1^2} + \frac{X_2^2}{\Sigma_2^2} + \frac{X_3^2}{\Sigma_3^2} = c^2$$

is

$$\frac{4}{3}\pi c^3\Sigma_1\Sigma_2\Sigma_3.$$

Therefore the volume between ellipsoids c and $c + \delta c$ is

$$4\pi\,.\,\Sigma_1\Sigma_2\Sigma_3 c^2\delta c.$$

Hence the total frequency contained between these two ellipsoids is

$$N\sqrt{\frac{2}{\pi}}c^2e^{-\frac{1}{2}c^2}\delta c$$

Therefore the chance that an observation falls inside the ellipsoid c is

$$\sqrt{\frac{2}{\pi}}\int_0^c c^2e^{-\frac{1}{2}c^2}dc$$

$$= \sqrt{\frac{2}{\pi}}\left\{-ce^{-\frac{1}{2}c^2} + \int_0^c e^{-\frac{1}{2}c^2}dc\right\}$$

$$= \Phi, \text{ say.}$$

Of the two terms in the bracket, the first can be readily calculated from our previous table of the exponential function (p. 845), and the second can be obtained from the tables of the probability integral given in most text-books.[24] The small table below gives the values of the chance $(1 - \Phi)$ for a certain range of the values of c, *i.e.*, the chance that the observation shall lie *outside* the ellipsoid :—[25]

c.	$1 - \Phi$.	c.	$1 - \Phi$.
0·2	0·9979	2·2	0·1839
0·4	0·9838	2·4	0·1238
0·6	0·9484	2·6	0·0799
0·8	0·8873	2·8	0·0493
1·0	0·8012	3·0	0·0293
1·2	0·6962	3·2	0·0167
1·4	0·5807	3·4	0·0091
1·6	0·4645	3·6	0·0046
1·8	0·3561	3·8	0·0024
2·0	0·2614	4·0	0·0011

Since the regression is truly linear, all the expressions for net regressions and net coefficients of correlation (given in Part I) are immediately and definitely interpretable without any limitations such as are necessary in the general case. In the present case of three variables, for example, the coefficient of correlation between x_1 and x_2 *in any group for which* x_3 *is constant* is

$$\frac{r_{12} - r_{13}r_{23}}{\sqrt{(1 - r_{13})^2(1 - r_{23}^2)}}$$

[24] The majority of such tables appear to be derived from Kramp's "Analyse "des Réfractions," Strasburg, 1798. There are convenient tables in Galloway's "Probability" (Edinburgh, 1839), and in De Morgan's "Encyclopædia Metro-"politana," "Treatise on the Theory of Probabilities" (1837).

[25] I cannot see any error in the values here given, but they differ from some tabulated by Czuber, *Theorie der Beobachtungsfehler*, 1891, p. 404. These theorems on the chance of an observation lying within a given ellipse or ellipsoid are due to Bravais, *loc. cit.*

as given on p. 833, and similar expressions hold good for the coefficients of correlation in other sub-groups.

It is hardly necessary to proceed to deal in detail with the cases of four or more variables, as the preceding examples of two and three variables are sufficient to show the general character of normal correlation. Consideration of the exponent as in the previous cases shows that the properties must always hold that (1) the standard deviations of all x_n-arrays are equal, (2) the regression is strictly linear, (3) the frequency is constant over a quadratic surface, (4) the net coefficients between all sub-groups of $x_n\, x_m$, corresponding to given types of the remaining variables, are equal.

In the majority of cases of economic interest the correlation is not normal, *e.g.*, in cases involving variations of pauperism, prices, rateable values, or quantities varying with age such as marriage-rates. In most economic examples in fact the amount of the variation is a considerable fraction of the mean, and it is a necessary condition for the occurrence of normal variation that deviations should only be small compared with the mean; otherwise in fact an absolute physical limit might be close to the mean on one side, a limit for which normal variation cannot allow. But in some instances of great importance, *e.g.*, anthropometry, the normal law holds very approximately, and in any case is so frequently useful for obtaining approximations and theoretical results (in probable errors and so forth), that the statistician should be familiar with it.

For the exposition of the normal theory in the general case, *vide* Edgeworth, "Correlated Averages," "Phil. Mag.," 1892, vol. xxxiv, p. 190, or Pearson, "Regression, Heredity, &c., "Phil. Trans." (A), 1896, vol. clxxxvii, p. 253.

APPENDIX.

TABLE I.—*Giving the Values of* $1 - r^2$ *and* $\sqrt{1 - r^2}$ *and their first Differences, for all Values of* r *between* 0 *and* 1, *proceeding by Hundredths.*

r.	$1 - r^2$.	Δ_1.	$\sqrt{1 - r^2}$.	Δ_1.
0·01	0·9999	3	0·99995	15
0·02	0·9996	5	0·99980	25
0·03	0·9991	7	0·99955	35
0·04	0·9984	9	0·99920	45
0·05	0·9975	11	0·99875	55
0·06	0·9464	13	0·99820	65
0·07	0·9951	15	0·99755	75
0·08	0·9936	17	0·99679	85
0·09	0·9919	19	0·99594	95
0·10	0·9900	21	0·99499	106
0·11	0·9879	23	0·99393	116
0·12	0·9856	25	0·99277	126
0·13	0·9831	27	0·99151	136
0·14	0·9804	29	0·99015	146
0·15	0·9775	31	0·98869	157
0·16	0·9744	33	0·98712	167
0·17	0·9711	35	0·98544	177
0·18	0·9676	37	0·98367	188
0·19	0·9639	39	0·98178	199
0·20	0·9600	41	0·97980	209
0·21	0·9559	43	0·97770	220
0·22	0·9516	45	0·97550	231
0 23	0·9471	47	0·97319	242
0·24	0·9424	49	0·97077	253
0·25	0·9375	51	0·96825	264
0·26	0·9324	53	0·96561	275
0·27	0·9271	55	0·96286	286
0·28	0·9216	57	0·96000	297
0·29	0·9159	59	0·95703	309
0·30	0·9100	61	0·95394	320
0·31	0·9039	63	0·95074	332
0·32	0·8976	65	0·94742	344
0·33	0·8911	67	0·94398	356
0·34	0·8844	69	0·94043	368
0·35	0·8775	71	0·93675	380
0·36	0·8704	73	0·93295	392
0·37	0·8631	75	0·02903	405
0·38	0·8556	77	0 92498	417
0·39	0·8479	79	0·92081	430
0·40	0·8400	81	0·91651	443
0·41	0·8319	83	0·91209	456
0·42	0·8236	85	0·90752	470
0·43	0·8151	87	0·90283	483
0·44	0·8064	89	0·89800	497

TABLE I.—*Giving the Values of* $1 - r^2$ *and* $\sqrt{1 - r^2}$—*Contd.*

r.	$1 - r^2$.	Δ_1.	$\sqrt{1 - r^2}$.	Δ_1.
0·45	0·7975	91	0·89303	511
0·46	0·7884	93	0·88792	525
0·47	0·7791	95	0·88267	540
0·48	0·7696	97	0·87727	555
0·49	0·7599	99	0·87172	570
0·50	0·7500	101	0·86603	585
0·51	0·7399	103	0·86017	601
0·52	0·7296	105	0·85417	617
0·53	0·7191	107	0·84800	633
0·54	0·7084	109	0·84167	650
0·55	0·6975	111	0·83516	667
0·56	0·6864	113	0·82849	685
0·57	0·6751	115	0·82164	703
0·58	0·6636	117	0·81462	721
0·59	0·6519	119	0·80740	740
0·60	0·6400	121	0·80000	760
0·61	0·6279	123	0·79240	780
0·62	0·6156	125	0·78460	801
0·63	0·6031	127	0·77660	822
0·64	0·5904	129	0·76837	844
0·65	0·5775	131	0·75993	867
0·66	0·5644	133	0·75127	890
0·67	0·5511	135	0·74236	915
0·68	0·5376	137	0·73321	940
0·69	0·5239	139	0·72381	967
0·70	0·5100	141	0·71414	994
0·71	0·4959	143	0·70420	1023
0·72	0·4816	145	0·69397	1053
0·73	0·4671	147	0·68345	1084
0·74	0·4524	149	0·67261	1117
0·75	0·4375	151	0·66144	1151
0·76	0·4224	153	0·64992	1188
0·77	0·4071	155	0·63804	1226
0·78	0·3916	157	0·62578	1267
0·79	0·3759	159	0·61311	1311
0·80	0·3600	161	0·60000	1357
0·81	0·3439	163	0·58643	1407
0·82	0·3276	165	0·57236	1460
0·83	0·3111	167	0·55776	1518
0·84	0·2944	169	0·54259	1580
0·85	0·2775	171	0·52678	1649
0·86	0·2604	173	0·51029	1724
0·87	0·2431	175	0·49305	1808
0·88	0·2256	177	0·47497	1901
0·89	0·2079	179	0·45596	2007
0·90	0·1900	181	0·43589	2128
0·91	0·1719	183	0·41461	2269
0·92	0·1536	185	0·39192	2436
0·93	0·1351	187	0·36756	2639
0·94	0·1164	189	0·34117	2892
0·95	0·0975	191	0·31225	3225
0·96	0·0784	193	0·28000	3690
0·97	0·0591	195	0·24310	4411
0·98	0·0396	197	0·19900	5793
0·99	0·0199	199	0·14107	14107
1·00	0·0000	—	0·00000	—

TABLE II.—*Giving the Probable Errors of the Correlation Coefficient r for various Numbers of Observations.*

Number of Observations.	Correlation Coefficient *r*.										
	0·0.	0·1.	0·2.	0·3.	0·4.	0·5.	0·6.	0·7.	0·8.	0·9.	1·0.
25....	0·1349	0·1335	0·1295	0·1228	0·1133	0·1012	0·0863	0·0688	0·0486	0·0256	0
50....	0·0954	0·0944	0·0916	0·0868	0·0801	0·0715	0·0610	0·0486	0·0343	0·0181	0
75....	0·0779	0·0771	0·0748	0·0709	0·0654	0·0584	0·0498	0·0397	0·0280	0·0148	0
100....	0·0674	0·0668	0·0648	0·0614	0·0567	0·0506	0·0432	0·0344	0·0243	0·0128	0
200....	0·0478	0·0473	0·0459	0·0435	0·0402	0·0359	0·0306	0·0244	0·0172	0·0091	0
300....	0·0389	0·0386	0·0374	0·0354	0·0327	0·0292	0·0249	0·0199	0·0140	0·0074	0
400....	0·0337	0·0334	0·0324	0·0307	0·0283	0·0253	0·0216	0·0172	0·0121	0·0064	0
500....	0·0302	0·0299	0·0290	0·0274	0·0253	0·0226	0·0193	0·0154	0·0109	0·0057	0
600....	0·0275	0·0273	0·0264	0·0251	0·0231	0·0207	0·0176	0·0140	0·0099	0·0052	0
700....	0·0255	0·0252	0·0245	0·0232	0·0214	0·0191	0·0163	0·0130	0·0092	0·0048	0
800....	0·0238	0·0236	0·0229	0·0217	0·0200	0·0179	0·0153	0·0122	0·0086	0·0045	0
900....	0·0225	0·0223	0·0216	0·0205	0·0189	0·0169	0·0144	0·0115	0·0081	0·0043	0
1,000....	0·0213	0·0211	0·0205	0·0194	0·0179	0·0160	0·0137	0·0109	0·0077	0·0041	0

MISCELLANEA.

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I.—*Relations between the Accuracy of an Average and that of its Constituent Parts.* *By* A. L. Bowley, M.A.

The results which follow were obtained in connection with the Newmarch Lectures, 1897:—

In the physical sciences it is not found possible to make exact measurements; bodies can be weighed correctly to one-hundredth of a milligram, measured to one-hundredth of a millimetre, but a limit of accuracy is soon reached in all cases. In some measurements, *e.g.*, of the density of the earth or of the parallax of a star, the limit is reached before the third figure. In such cases it is well understood that the number given is not exact, but only correct to a certain figure. Statistical measurements of economic quantities resemble physical measurements; in some cases, as in the population census, the first four or five figures of the total are reliable; in others, as the index-number of the fall of prices, authorities do not agree in the second figure. It is not the practice in current statistical publications, nor indeed in the calculations of experts, to state the *accuracy* of the totals or averages reached; in "blue books" totals are laboriously given to the uttermost pound, without regard to the precision of the measuring instrument.

It is true that in general it is not easy to take a statistical total and say definitely, "this is correct to the fourth figure;" but examination of the circumstances of an estimate will often enable us to verify that no change in method of estimate can affect certain figures (say the 100,000's in a census), while trifling accidents or omissions would affect the units' or tens' digits. Put in a slightly different way, an inferior or superior limit can often be assigned to the errors possible in a given total, so that we might say, for instance, the average height of Englishmen is 68 inches, with a possible error of $\pm$ 1 inch.

In some cases we can by help of the laws of probability proceed further and make some such statement as the following: the average wage of a certain group is 24*s.* 6*d.*, with a possible error of $\pm$ 6*d.*, but with a "probable error" of 1*d.*; that is, that under the conditions of the investigation it is an even chance that an error of at least 1*d.* is made in the average.

When dealing with averages or with comparisons of estimates, it is clear to the statistical mind that the effects on an average of errors in separate items will be unequal and in some way propor-

tional to the quantities to which the errors correspond. Experience and theory show that a weighted average is less affected by errors in weights than by errors in the quantities to which they are applied. It is also clear *à priori* that, in comparison of two estimates compiled under similar conditions, the errors of omission or bias common to both estimates tend to neutralise each other. Again, theory and experience show that in an average taken over a great number of separate items errors tend to disappear. These facts have long been common property; but the exact connection between errors in items and errors in average, and the extent to which a comparison is likely to be more accurate than its separate terms, have hardly, except in connection with the theory of index numbers, received the attention they deserve. The following analysis is an attempt to follow the effect of initial errors of all sorts throughout the calculations of averages and ratios; so as to first give general results which make no assumption as to the magnitude of the errors (except perhaps that they are less than 100 per cent.), and show the ultimate effect each error can have on the result; secondly, to separate the effects of certain classes of errors and give approximate results, when certain assumptions are made as to their relative size; and, thirdly, to show by the theory of errors that, under certain conditions, the error of the result bears definite relations to initial errors, and to estimate the probable error of the result in terms of the magnitude of these errors.

The formulæ obtained afford a means of comparing the accuracy of different classes of estimates; and the investigation shows that certain operations, *e.g.* averaging and comparing, tend markedly to accuracy, and that errors of different classes have very different effects on the result. From the analysis some rules can be deduced by which the accuracy of an investigation can be increased; but these rules and the formulæ themselves can only be safely applied when the details of the work have been followed.

Definition. If u be the measurement of a quantity whose true value is u', then $\frac{u'-u}{u}$ may be called the error of measurement of u; so that if e be error, $e = \frac{u'-u}{u}$ or $u' = u\,(1+e)$.

A. Simple Instances.

I. *Error due to omission of part of data.*

In many measurements, such as those of wages, want of employment, &c., part of the data necessary to make a complete estimate are inaccessible.

Suppose that it is found that w persons earn on an average m shillings each, while rw persons earning on an average $m\,(1+\rho)$ shillings are erroneously omitted,

$$\text{then error in average due to omission} = \frac{\frac{wm + wrm(1+\rho)}{w+wr} - m}{m}$$

$$= \frac{r\rho}{1+r} = r\rho, \text{ if } r^2 \text{ is small compared with } r \quad . \quad . \quad (a)$$

A superior limit can often be assigned to r and ρ.

II. *Error due to inaccuracy in part of the data.*

In the previous case it may often be possible to make a good estimate of the omitted data.

Let w, m be measured correctly; and let rw, $m(1+\rho)$ be estimates of quantities whose true values are $rw(1+\epsilon)$, $m(1+\rho)(1+e)$.

Error in average

$$= \frac{\dfrac{wm + wr(1+\epsilon)\, m(1+\rho)(1+e)}{w + wr(1+\epsilon)} - \dfrac{wm + rwm(1+\rho)}{w+rw}}{\dfrac{wm + rwm(1+\rho)}{w+rw}}$$

$$= \rho r\{e(1+r) + \epsilon + e\epsilon(1+r)\}\{1 + r(1+\rho)\}\{1 + r(1+\epsilon)\}^{-1}$$

$$= \rho r\{e(1-r-r\rho) + \epsilon(1-2r-r\rho)\}, \text{ if } \epsilon^2,\ e\epsilon \text{ and } r^3 \text{ are small compared with } re,\ r\epsilon$$

$$= \rho r(e+\epsilon), \text{ if } r^2e,\ r^2\epsilon \text{ are small compared with } re,\ r\epsilon \quad . \quad . \quad (\beta)$$

The nature of the investigation will often determine in what order terms become negligible.

III. *Error in Arithmetic Average.*

If $m_1, m_2 \ldots m_n$ are estimates of *quantities* whose true values are $m_1(1+e_1), m_2(1+e_2), \ldots$, error in their arithmetic average $=$

$$\frac{\dfrac{\Sigma m(1+e)}{n} - \dfrac{\Sigma m}{n}}{\dfrac{\Sigma m}{n}} = \frac{\Sigma me}{\Sigma m}, \text{ where } \Sigma \text{ denotes summation from 1 to } n. \qquad (\gamma)$$

IV. *Error in Weighted Average.*

Let $w_1, w_2 \ldots$ be *weights* applied to $m_1, m_2 \ldots$.

Let $w_1(1+\epsilon_1), w_2(1+\epsilon_2) \ldots$ be true weights.

Error in weighted average $= \left(\dfrac{\Sigma m(1+e)w(1+\epsilon)}{\Sigma w(1+\epsilon)} - \dfrac{\Sigma mw}{\Sigma w}\right) \div \dfrac{\Sigma mw}{\Sigma w}$

$$= \frac{\Sigma w\,.\,(\Sigma mwe + \Sigma mw\epsilon) - \Sigma mw\,.\,\Sigma we}{\Sigma mw\,.\,(\Sigma w + \Sigma w\epsilon)}, \text{ if } e\epsilon \text{ is neglected} =$$

$$\frac{\Sigma mwe}{\Sigma mw} + \frac{\Sigma\{w_s w_t(m_s - m_t)(\epsilon_s - \epsilon_t)\}}{\Sigma w\,.\,\Sigma mw}, \text{ if products } \epsilon_1\epsilon_2, \text{ \&c., are neglected,}$$

where the second summation is extended over the $\frac{1}{2}n(n-1)$ pairs s, t. ... ... (δ)

It may be noticed that as the m's, that is the *quantities* to which the *weights* are applied, or the ϵ's, that is the errors in the estimates of the *weights*, approach equality, the part of the resulting error due to *weight* diminishes in comparison with that due to *quantity*. Hence error due to miscalculation of *weights* appears to be of less importance than that due to miscalculation of *quantities*.

The following table affords a good illustration of the small effect produced by different systems of weighting.

The first three columns are from the *General Report on the Wages of the Manual Labour Classes* [C–6889, 1893], p. 470. In the fourth column is found the average wage when the trades are weighted from the population census, zero weights being applied when the trade was not easily distinguishable; in the fifth column

the average when a purely arbitrary system of weights is applied; in the sixth column the arithmetic average of Col. 2.

Example of the Smallness of Change introduced by difference in systems of Weighting.

Trade.	Average Wages (Men).	Number included in Returns.	Numbers Employed in Trade, when known. From Population Numbers, 1 = 1,000.	Arbitrary System of Weights.	Equal Weights.
	s. *d.*				
Cotton manufacture	25 3	32,189	142	144	1
Woollen „	23 2	12,248	54	172	1
Worsted and stuff manufacture	23 4	7,005	38	219	1
Linen manufacture	19 9	6,807	22	96	1
Jute „	19 4	2,799	9	23	1
Hemp, &c. „	23 6	1,232	3	78	1
Silk „	22 3	2,248	10	189	1
Carpet „	26 7	1,292	0	213	1
Hosiery „	24 5	1,070	8	287	1
Lace „	27 3	593	8	51	1
Small wares	20 2	2,734	0	225	1
Flock and shoddy manufacture	21 2	330	2	200	1
Coal, iron ore, and ironstone mines	22 11	67,429	57	141	1
Metalliferous mines	16 6	5,046	0	190	1
Shale mines and paraffin oil works	25 –	3,021	0	207	1
Slate mines and quarries	22 1	6,933	12	232	1
Granite quarries and works	21 11	2,315		206	1
Stone quarries	23 10	3,956		34	1
China clay, &c., works	18 8	499	0	39	1
Police	27 7	52,682	58	224	1
Roads, pavements, and sewers	20 9	24,276	0	29	1
Gasworks	27 2	27,965	0	40	1
Waterworks	24 9	5,187	0	151	1
Pig iron (blast furnaces)	24 6	6,234	0	128	1
General engineering, iron, and brass founding, and machinery trades	25 9	41,658	200	173	1
Shipbuilding, iron and steel	29 3	10,661	80	228	1
Tinplate works	33 5	1,514	0	178	1
Sawmills	24 3	2,088	0	174	1
Brass works and metal wares	29 7	1,838	0	222	1
Shipbuilding, wood	28 4	454	0	79	1
Cooperage works	30 5	327	0	165	1
Coach and carriage building	26 6	1,664	0	28	1
Boot and shoemaking	24 3	2,902	0	142	1
Breweries	24 3	8,366	0	46	1
Distilleries	20 4	1,795	0	129	1
Brick and tile, &c., making	22 10	3,188	0	55	1
Chemical manure works	23 –	1,054	0	210	1
Railway carriage and waggon building	25 2	2,239	0	233	1
	s. *d.*		*s.* *d.*	*s.* *d.*	*s.* *d.*
Averages*	24 6·6		24 3	24 5¼	24 4

* From the four systems of weighting.

V. *Effect of Bias, simplest case.*

Notation as in III.

Let n' errors be due to bias, conscious or unconscious, on the part of the investigator, and let them be all in the same sense, that is, all positive or all negative; and let n'' be without bias, equally likely to be positive or negative. Let $n' + n'' = w$.

Suppose that each biassed error $= \eta$, each unbiassed $= e$.

$$\text{Error} = \frac{\Sigma me}{\Sigma m} = \frac{n'\eta + ke}{n}, \text{ if the } m\text{'s are nearly equal,} \quad \dots \quad (\epsilon)$$

where the most probable value of k is zero, and the chance that $k =$ any number s is $\dfrac{{}^{n''}C_{\frac{n''-s}{2}}}{2^{n''}}$.

Hence it appears that unbiassed errors can be neglected in comparison with biassed. In a practical calculation, estimated corrections should be applied for biassed errors; resulting errors are then unbiassed.

B. Errors in comparison of two estimates.

I. *General case.*

Let m, m' be estimates, at different times or places, of two similar quantities made under similar conditions by similar methods, so that there is a tendency for errors in similar items to be alike in sense and magnitude.

Let $m(1+e)$, $m'(1+e')$ be true values of m and m'.

Error of ratio $=$

$$\frac{\dfrac{m'(1+e')}{m(1+e)} - \dfrac{m'}{m}}{\dfrac{m'}{m}} = \frac{e'-e}{1+e} = (e'-e)\,(1-e+e^2) = e'-e,$$

approximately ... ... (ξ)

$=$ difference between errors of single estimates, and is less than the greater of them when e', e are of same sign.

II. *Effect on comparison of omission of part of data.*

Notation as in A I for one estimate; while w', m', r', ρ' are corresponding quantities for comparative estimate.

Error of ratio

$$= \left\{ \frac{w'm'(1+r'\overline{1+\rho'})}{w'(1+r')} \div \frac{wm(1+r\overline{1+\rho})}{w(1+r)} - \frac{m'}{m} \right\} \div \frac{m'}{m}$$

$$= \frac{r'\rho'(1+r) - r\rho(1+r')}{(1+r+r\rho)(1+r)} = r'\rho' - r\rho, \text{ approx.}$$

Let $\rho' = \rho(1+\mathrm{E})$, $r' = r(1+\eta)$, where E and η may be expected to be small, since they depend on the *change* in the proportion of the part omitted to that included.

Neglecting all terms containing four of the quantities η, E, r, ρ

error $= r\rho(\eta + \mathrm{E})$, approx. ... ... (η)

III. *Error in comparison of weighted averages.*

Let $m_1, m_2 \dots m_n$ be observed *quantities* with estimated *weights* $w_1, w_2 \dots$ in one year or place.

Let $m_1', m_2' \dots m_n'$ be observed *quantities* with estimated *weights* $w_1', w_2' \dots$ in another year or place.

Let $m_1(1+e_1)\ldots$, $w_1(1+\epsilon_1)\ldots$, $m_1'(1+e_1')\ldots$, $w_1'(1+\epsilon_1')$ be true values of these quantities and weights, &c.

Suppose that these quantities are connected with each other by the equations $m_1'=m_1(1+r_1)\ldots$, $w_1'=w_1(1+\rho_1)\ldots$, $e_1'=e_1(1+d_1)\ldots$, $\epsilon_1'=\epsilon_1(1+\delta_1)\ldots$ Then e, ϵ, r, ρ, d and δ may be considered to be of the same order of small quantities; or, if they differ, by the errors (e, ϵ), for instance, being small in comparison with the rates of change (r, ρ), our approximation to the second order of small quantities will be *correct to the order of the greatest included* products of two, or squares of one of these quantities. Thus if r, ρ are greater than e, ϵ, when we neglect $r^2\rho$, $e^2\epsilon$ in comparison with $r\rho$ or $e\epsilon$, the result is correct to order of $r\rho$, but may include valueless infinitesimal terms of order $e\epsilon$. Notice that $d=\dfrac{e'-e}{e}$ and $\delta=\dfrac{\epsilon'-\epsilon}{\epsilon}$, so that d and δ are not small if e', ϵ' are large compared with e, ϵ. If however the methods of estimate are similar ϵ' and ϵ will be of same order. *To obtain correctness of ratio it is of little use to make second estimate more accurate than first.*

$$\text{Ratio of the weighted averages} = \frac{\Sigma m'w'}{\Sigma w'} : \frac{\Sigma mw}{\Sigma w} = \frac{\Sigma m'w' \,.\, \Sigma w}{\Sigma mw \,.\, \Sigma w'}.$$

$$\text{Error of ratio} = \frac{\dfrac{\Sigma m'(1+e')\,w'(1+\epsilon')\,.\,\Sigma w(1+\epsilon)}{\Sigma m(1+e)w(1+\epsilon)\,.\,\Sigma w'(1+\epsilon')} - \dfrac{\Sigma m'w' \,.\, \Sigma w}{\Sigma mw \,.\, \Sigma w'}}{\dfrac{\Sigma m'w' \,.\, \Sigma w}{\Sigma mw \,.\, \Sigma w'}}$$

$$= \frac{\Sigma m'(1+e')\,.\,w'(1+\epsilon')\,.\,\Sigma w(1+\epsilon)\,.\,\Sigma mw\,.\,\Sigma w' - \Sigma m'w'\,.\,\Sigma w \;\; \Sigma m(1+e)\,.\,w(1+\epsilon)\,.\,\Sigma w'(1+\epsilon')}{\Sigma m(1+e)\,.\,w(1+\epsilon)\,.\,\Sigma w'(1+\epsilon')\,.\,\Sigma m'w'\,.\,\Sigma w}.$$

Numerator

$$= \Big[\Sigma\big\{mw(1+r)\,(1+\rho)\,(e+\epsilon+ed+\epsilon\delta)\big\}\,.\,\Sigma mw - \Sigma mw(e+\epsilon)\,.\,\Sigma mw(1+r)\,(1+\rho)\Big]\,.\,\Sigma w\,.\,\Sigma w(1+\rho)$$
$$+\Big[\Sigma w\epsilon\,.\,\Sigma w(1+\rho) - \Sigma\big\{w\epsilon(1+\rho)\,(1+\delta)\big\}\,.\,\Sigma w\Big]\,.\,\Sigma mw\,.\,\Sigma mw(1+r)\,(1+\rho)$$
$$+\Big[\Sigma\big\{mwe\epsilon(1+r)\,(1+\rho)\,(1+d)\,(1+\delta)\big\}\,\Sigma mw - \Sigma mwe\epsilon\,.\,\Sigma mw(1+r)\,(1+\rho)\Big]\,.\,\Sigma w\,.\,\Sigma w(1+\rho)$$
$$+\Sigma\big\{mw(1+r)\,(1+\rho)\,(e+\epsilon+ed+\epsilon\delta)\big\}\,\Sigma we\,.\,\Sigma mw\,.\,\Sigma w$$
$$-\Sigma\big\{mw(e+\epsilon)\,(1+\rho)\,(1+\delta)\big\}\,.\,\Sigma mw(1+r)\,(1+\rho)\,.\,\Sigma w(1+\rho).$$

= (neglecting products three at a time of any of the quantities r, ρ, e, ϵ, d, δ)

$$\Sigma mwde\,.\,\Sigma mw\,.\,(\Sigma w)^2 + \Sigma\{m_sm_tw_sw_t(r_s-r_t)(e_s-e_t)\}\,.\,(\Sigma w)^2$$
$$+\Sigma\{m_sm_tw_sw_t(\rho_s-\rho_t)\;(e_s-e_t)\}\,.\,(\Sigma w)^2$$
$$+\Sigma\{w_sw_t(m_s-m_t)\;(\epsilon_s\delta_s-\epsilon_t\delta_t)\}\,.\,\Sigma w\,.\,\Sigma mw$$
$$+\Sigma\{m_sm_tw_sw_t(r_s-r_t)\;(\epsilon_s-\epsilon_t)\}\,.\,(\Sigma w)^2$$
$$+\Sigma\{m_sm_tw_sw_t(\rho_s-\rho_t)\;(\epsilon_s-\epsilon_t)\}\,.\,(\Sigma w)^2$$
$$-\Sigma\{w_sw_t(\rho_s-\rho_t)\;(\epsilon_s-\epsilon_t)\}\,.\,(\Sigma mw)^2.$$

$$\text{Error} = \underset{\text{A}}{\frac{\Sigma mwde}{\Sigma mw}} + \underset{\text{B}}{\frac{\Sigma\{m_sm_tw_sw_t(r_s-r_t)\;(e_s-e_t)\}}{(\Sigma mw)^2}}$$
$$+ \underset{\text{C}}{\frac{\Sigma\{m_sm_tw_sw_t(\rho_s-\rho_t)\;(e_s-e_t)\}}{(\Sigma mw)^2}} + \underset{\text{D}}{\frac{\Sigma\{m_sm_tw_sw_t(r_s-r_t)\;(\epsilon_s-\epsilon_t)\}}{(\Sigma mw)^2}}$$

$$+\frac{\overset{\text{E}}{\Sigma\{w_s w_t(m_s-m_t)\ (\epsilon_s\delta_s-\epsilon_t\delta_t)\}}}{\Sigma m\ .\ \Sigma mw}$$

$$+\frac{\overset{\text{F}}{\Sigma\left[w_s w_t(\rho_s-\rho_t)\ (\epsilon_s-\epsilon_t)\{m_s m_t(\Sigma w)^2-(\Sigma mw)^2\}\right]}}{(\Sigma m\ .\ \Sigma mw)^2}$$, where Σ denotes sum of all possible values of $m_s m_t$, and similarly with other summations ... ...

If the inaccurate quantity m may be expected to be nearly equal to the accurate m_1, as in the case of average wages, and the weight w is small compared with w_1, let $m = m_1(1+\mu)$ and $w = \mathrm{R}w_1$ where μ and R are small.

Substitute and neglect $\mu\mathrm{R}$, μ^2, R^2 in comparison with μ and R, and we obtain $\mathrm{R}ed + \mathrm{R}\{(r - r_1 + \rho - \rho_1)e + (r - r_1)\epsilon\}$ ... (ι)

μ not occurring without R, it does not enter in this approximation.

An example will make the use of this formula clearer. Suppose that it is known that 1,000 men in one year are earning on an average at the rate of 30*s.*, and in another 1,100 at 32*s.*; and that it is estimated that there are also 100 men earning 24*s.* in one year and 120 earning 25*s.* in another, while in reality there are 80 men earning 25*s.* in the first, and 120 earning 24*s.* in the second.

Here estimated averages are $29\frac{5}{11}s.$, $31\frac{1}{61}s.$ Estimated ratio 1·0638. True averages $29\frac{17}{27}s.$, $31\frac{13}{61}s.$ True ratio 1·0534.

Error in ratio $= \dfrac{1{\cdot}0534 - 1{\cdot}0628}{1{\cdot}0638} = -{\cdot}0098$. Errors in separate years are + ·007 and − ·0016, whose difference = − ·0086.

In this case $m_1 = 30$, $m = 24$, $\mu = -\frac{1}{5}$, $w_1 = 1{,}000$, $w = 100$, $\mathrm{R} = \frac{1}{10}$, $e = \frac{1}{24}$, $\epsilon = -\frac{1}{5}$, $r_1 = \frac{1}{15}$, $r = \frac{1}{24}$, $\rho_1 = \frac{1}{10}$, $\rho = \frac{1}{5}$, $d = -2$, $\delta = -1$.

Error from formula (ι) = −·0074.

In this case where all the errors are large and tend in the same direction the formula agrees with the fact to one five-hundredth part of true ratio.

If only first term R.ed is taken, we obtain −·008. The comparative greatness of this term is due to the fact that the errors in quantity are in opposite senses, and consequently $d = -2$, $ed = -\frac{1}{12}$.

C. Probable Values of Errors,

If e_1, e_2, ... are n small quantities ranging under a probability curve, where it is equally likely that any one of these quantities does or does not lie between $\pm \mathrm{E}_1$, and if c_1, c_2, c_3, ... are any constants, then the sum $c_1e_1 + c_2e_2 + \ldots$ belongs to a curve of error whose probable error is $\sqrt{(c_1^2 + c_2^2 + \ldots)}.\mathrm{E}_1$.*

I. *Probable value of error in an arithmetic average.*

From formula (γ), error in arithmetic average is $\dfrac{\Sigma me}{\Sigma m}$, where the e's are errors of the separate m's.

If E_1 is defined as above, the probable error in the arithmetic average $= \dfrac{\sqrt{\Sigma(m^2)}}{\Sigma m}.\mathrm{E}_1$.

If the m's are nearly equal, and are n in number, this is of order $\dfrac{\sqrt{nm^2}}{nm}\ \mathrm{E}_1 = \dfrac{\mathrm{E}_1}{\sqrt{n}}$.

* For proofs of the theorems used in these pages, and analysis of the nature of the e's for which they are true, see Todhunter's *History of the Theory of Probability*, art. 993 and 1003, and *Literary and Philosophical Magazine*, November, 1892 and 1896, and *Report of the British Association* (Committee on Variations in Value of Monetary Standard), 1887-88, especially 1888, pp. 188—198.

II. *Probable value of error in a Weighted Average.*
From formula (δ), error in weighted average is

$$\frac{\Sigma mwe}{\Sigma mw} + \frac{\{w_s w_t (m_s - m_t)(\epsilon_s - \epsilon_t)\}}{\Sigma w . \Sigma mw}.$$

Probable error for $\frac{\Sigma mw\, e}{\Sigma mw} = \frac{\sqrt{\Sigma m^2 w}}{mw} . \mathrm{E}_1 = k_1$

Let E_2 bear the same relation to the ϵ's as E_1 to the e's.
$\frac{\mathrm{E}_2}{\sqrt{2}}$ bears same relation to $\epsilon_s - \epsilon_t$ as E_2 to ϵ.

Probable error for

$$\frac{\Sigma\{w_s w_t (m_s - m_t)(\epsilon_s - \epsilon_t)\}}{\Sigma w . \Sigma mw} \text{ is } \frac{\sqrt{[\Sigma\{w_s w_t (m_s - m_t)\}^2]}}{\Sigma w . \Sigma mw} . \frac{\mathrm{E}_2}{\sqrt{2}} = k_2.$$

Hence the probable error for the weighted average is $\sqrt{k_1^2 + k_2^2}$.

If $w_1 m_1$ is the greatest, and $w_2 m_2$ the least of the products wm

$$k_1 < \frac{\sqrt{n(w_1 m_1)^2}}{n w_2 m_2} . \mathrm{E}_1 < \frac{w_1 m_1}{w_2 m_2} . \frac{\mathrm{E}_1}{\sqrt{n}},$$

and if the products do not differ greatly from each other, and n is large, k_1 is of the same order as $\frac{\mathrm{E}_1}{\sqrt{n}}$.

If X is the greatest of the $\frac{1}{2}n(n-1)$ quantities $w_s w_t (m_s - m_t)$, and w_3 the least of the w's,

$$k_2 < \frac{\mathrm{X}\sqrt{\frac{1}{2}n(n-1)}}{n w_2 m_2 . n w_3} . \frac{\mathrm{E}_2}{\sqrt{2}} < \frac{\mathrm{X}}{w_2 m_2 w_3} . \frac{\mathrm{E}_2}{2n}.$$

If X_1^2 is arithmetic average of the $\frac{1}{2}n(n-1)$ quantities $\{w_s w_t (m_s - m_t)\}^2$
„ W „ n „ $w_1, w_2 \ldots$
„ M „ n „ $m_1 w_1, m_2 w_2 \ldots$,
then $k_2 = \frac{\mathrm{X}_1}{\mathrm{WM}} . \frac{\mathrm{E}_2}{2n}$ approximately.

If the w's are nearly equal, and $\overline{m}^2$ is arithmetic average of the quantities $\left\{ (m_s - m_t) \Big/ \frac{\Sigma m}{n} \right\}^2$, $k_2 = \overline{m} . \frac{\mathrm{E}_2}{2n}$ approximately.

If the m's conformed to a curve of error having a probable error q, then $(m_s - m_t) \Big/ \frac{\Sigma m}{n}$ belongs to a curve of error, having a probable error $\frac{nq}{\sqrt{2} . \Sigma m}$.

$\overline{m}$ is error of mean square, and therefore
$= \text{probable error} \times 1{\cdot}483$
$= \frac{n \times 1{\cdot}483}{\Sigma m \times 1{\cdot}414} q = \frac{21}{20} q \Big/ \frac{\Sigma m}{n}$ approx. $= \frac{21}{20} \lambda = \lambda$ approx., where λ is typical of the ratio of the individual m's to their average.
$\therefore k_2 = \frac{\lambda \mathrm{E}_2}{2n}$, where λ does not differ much from unity.

Hence, if *weights* are nearly equal, and *quantities* are distributed

about their mean nearly in accordance with law of error, probable value of error of a weighted average is of order

$$\sqrt{\left\{\frac{E_1^2}{n}+\frac{\lambda^2.E_2^2}{4n^2}\right\}}=\frac{E_1}{\sqrt{n}}, \text{ if } n \text{ is large} \quad \ldots \quad \ldots \quad \ldots \quad (\lambda)$$

III. *Probable value of error when observations are biassed.*

From formula (ϵ) error $= \dfrac{\Sigma me}{\Sigma m} = \dfrac{\Sigma_1^{n'} me + \Sigma_1^{n''} me}{\Sigma_1^{n} m}$.

Value of $\Sigma_1^{n'} me$ does not necessarily conform to any curve of error, and must be estimated from conditions of problem.

Probable value of $\Sigma_1^{n''} me$ is $\sqrt{\Sigma_1^{n''}(m^2)}.E_1$, where E_1 bears the customary relation to unbiassed errors.

IV. *Probable value of error in comparison of Weighted Averages.*

From formula (θ) error is $A+B+C+D+E+F$. Let k_a, k_b, k_c, k_d, k_e, k_f, be probable errors in these quantities.

Then, as before, $k_a = \dfrac{\sqrt{\Sigma(mw)^2}}{\Sigma mw}.D_1$, where D_1 is probable error for the ed's, that is for $(e'-e)$. If the estimates at the two places or periods are made on precisely similar lines, these differences of errors of *quantity*, and consequently D_1 may be very small. D_1 is generally smaller than E_1. Proceeding as before,

$$k_a \text{ is of the same order as } \frac{D_1}{\sqrt{n}}.$$

$$k_b = \frac{\sqrt{[\Sigma\{m_s m_t w_s w_t (r_s - r_t)\}^2]}}{(mw)^2}\cdot\frac{E_1}{\sqrt{2}}$$

$$k_c = \frac{\sqrt{[\Sigma\{m_s m_t w_s w_t (\rho_s - \rho_t)\}^2]}}{(\Sigma mw)^2}\cdot\frac{E_1}{\sqrt{2}},$$

$$k_d = \frac{\sqrt{[\Sigma\{m_s m_t w_s w_t (r_s - r_t)\}^2]}}{(\Sigma mw)^2}\cdot\frac{E_2}{\sqrt{2}},$$

where E_1, E_2 are probable errors for the e's and ϵ's.

These may be discussed, and superior limits assigned to them in the same way as when dealing with k_2 in C. II.

Let $\bar{r}$ be typical distance of the r's from their average, the r's being supposed to conform to a curve of error. Then $\dfrac{\bar{r}}{\sqrt{2}}$ is probable error for the quantities $r_s - r_t$, and

$$\sqrt{\Sigma(r_s-r_t)^2} = \sqrt{\frac{n(n-1)}{2}}\,\frac{21}{20}\,\bar{r} = \frac{n\bar{r}}{\sqrt{2}} \text{ approx.}$$

If the w's are nearly equal and the m's nearly equal $k_b = \dfrac{\bar{r}.E_1}{2n}$, $k_c = \dfrac{\bar{\rho}.E_1}{2n}$, $k_d = \dfrac{\bar{r}E_2}{2n}$, where $\bar{\rho}$ bears the same relation to the ρ's as $\bar{r}$ to the r's.

$k_e = \dfrac{\sqrt{[\Sigma\{w_s w_t (m_s - m_t)\}^2]}}{\Sigma m.\Sigma mw}\cdot\dfrac{D_2}{\sqrt{2}}$, where D_2 bears the same relation to ϵ, δ as D_1 to e d, and is consequently generally less than E_2.

If the w's are nearly equal and λ has the same meaning as in formula (λ),

$$k_e = \frac{\lambda \,.\, D_2}{2n}.$$

$$k_f = \frac{\sqrt{\left[\Sigma\{w_s w_t(\rho_s - \rho_t)\ (m_s m_t(\Sigma w)^2 - (\Sigma mw)^2)\}^2\right]}}{(\Sigma m \,.\, \Sigma mw)^2} \cdot \frac{E_2}{\sqrt{2}}.$$

There are $\frac{1}{2}n(n-1)$ terms such as $w_s w_t(\rho_s - \rho_t)(m_s m_t(\Sigma w)^2 - (\Sigma mw)^2)$.

If the w's are equal,

$$k_f = \sqrt{\left[\Sigma\left\{(\rho_s - \rho_t)\left(\frac{\frac{m_s}{\Sigma m}}{n} \cdot \frac{\frac{m_t}{\Sigma m}}{n} - 1\right)\right\}^2\right]} \frac{E_2}{n^2\sqrt{2}} = \frac{\bar{\mu} E_2}{2\bar{n}},$$

where $\bar{\mu}^2$ is arithmetic average of the $\frac{1}{2}n(n-1)$ quantities

$$\left\{(\rho_s - \rho_t)\left(\frac{\frac{m_s}{\Sigma m}}{n} \cdot \frac{\frac{m_t}{\Sigma m}}{n} - 1\right)\right\}^2,$$

so that $\bar{\mu}$ is apparently a proper fraction, diminishing when the ρ's (rates of increase of *weights*) or the m's approach equality.

Probable error for the comparison of weighted averages $= \sqrt{k_a^2 + k_b^2 + k_c^2 + k_d^2 + k_e^2 + k_f^2}$, and is of order

$$\sqrt{\left\{\frac{D_1^2}{n} + \frac{\bar{r}^2 + \bar{\rho}^2}{4n^2} \cdot E_1^2 + \frac{\bar{r}^2}{4n^2} E_2^2 + \frac{\lambda^2 D_2^2}{4n^2} + \frac{\bar{\mu}^2 E_2^2}{4n^2}\right\}} \ldots \qquad (\mu)$$

$\bar{r}$ and $\bar{\rho}$ become small when rates of change of *quantities* or *weights* tend to equality; λ is small when the *quantities* are nearly equal; $\bar{\mu}$ is small when $\bar{\rho}$ or λ is small.

Notice that no term measuring the dispersion of weights enters in the formula; but that the approximation was made on the assumption that the weights were equal, though not subject to equal errors or changing at equal rates.

When *quantities* are similar in magnitude, as for instance wages of adult male labour in one country, $\bar{m}$ and λ are small. When we are dealing with a general upward or downward movement, of prices or wages for instance, $\bar{r}$ becomes small. It cannot, however, in general be predicted that $\bar{\rho}$, which measures rate of change of weight, becomes small compared with single values of ρ.

If n is large, $\frac{D_1}{\sqrt{n}}$ is a first approximation to the probable error.

$\sqrt{\left\{\frac{D_1}{n} + \frac{\bar{\rho}^2 E_1^2}{4n^2}\right\}}$ is in some cases a second approximation, but this depends on the nature of the special investigation in hand.

If n is large, error due to *weight* is negligible in comparison with error due to quantity.

If the difference between the m's is very abnormal, errors E and F are increased. If the rates of increase of *quantity* or *weight* are much dispersed, errors B and D, or C are increased. If the methods followed in the two estimates are exactly similar as regards *quantity* and *weight*, A and E are diminished.

Thus the effect of dispersion of material, and of all the various

errors in estimate, can be traced separately in result; and if the data are carefully examined, the relative values of these errors can be estimated.

It is, of course, in general impossible to estimate our original errors e, e', ϵ, ϵ' on which our result depends; but we can often assign a superior limit to them.

If we are dealing, for instance, with 100, n, quantities, and neither weights, quantities, nor rates of increase are abnormally dispersed, and if we are confident that the probable error in our estimates of quantity is not greater than $\frac{1}{10}$, E_1, which would imply great inaccuracy of measurement, and if our errors in the two periods are similar, so that the probable error of their difference is $< E_1$, say $= \frac{E_1}{2}$, so that $D_1 = \frac{1}{20}$, then the ratio we find is probably correct within $\frac{D_1}{\sqrt{n}} = \frac{1}{200}$. That is, if we estimate the ratio of two groups of wages as 1 : 1·243, we may feel confident that the 4 is correct; and further approximation might enable us to establish the last figure 3. Such a result is of course only reliable when all the conditions of the investigation are satisfied.

It is only reasonable to suppose that many improvements are possible in the method of this investigation, and that in particular formula (μ) may be put into a form more convenient for use and of greater precision.

II.—*The Cost of Compensation for Mining Accidents in Germany.* *By* A. W. Flux, M.A.

The experience of the trade associations which carry out the provisions of the German accident insurance laws is of special interest at the present time, when attention is being drawn to the question of the probable cost, which the recently enacted provisions for compensation for accidents to workmen in certain industries in this country will involve.

So far as the mining industries are concerned, a recent elaborate report affords very detailed information in regard to what was done during the period from 1st October, 1885, to 31st December, 1894.[1] Not quite all one would wish to know is shown in the numerous tables of this volume, but it is possible to glean a good deal of very desirable information, and the statements and tables which follow comprise a selection of what appears most important.

The numbers affected are stated in the report as 3,623,175 persons insured, the unit of reckoning being apparently one person insured for one year. The average membership was therefore nearly 391,700, and in the year 1894 the German *Statistical Year Book* shows that the numbers averaged 426,555. Five years earlier

[1] *Statistik der Knappschafts-Berufsgenossenschaft für das Deutsche Reich* Berlin, 1897. 4to., 160 pp. With a map and twelve diagrams.

they were more than 50,000 fewer. It is more convenient to follow the report in summing up the facts for the whole period, bearing in mind that the results will apply to an average year in such matters as cost per workman insured. The results are given separately for coal-mining (Steinkohlenbergbau), lignite mines, metalliferous mines and smelting furnaces, salt mines and works, and other mineral mines. These again are classified according to eight districts of the empire. The relative preponderance of the first of these industries is very great, and we shall, for the most part, content ourselves with stating the general results for coal mining and for the whole group, not taking separately the districts. We have the following table showing for the nine and a quarter years the number of accidents :—

Nature of Mines.	In the Association.		In Businesses in which Accidents occurred.	
	Number Insured.	Wage Total.	Number Insured.	Wage Total.
		1,000 marks.		1,000 marks.
Coal	2,378,673	2,138,992	2,372,988	2,135,090
Lignite	331,522	242,212	298,453	221,845
Metal	758,853	533,090	732,079	518,043
Salt	95,423	91,445	91,438	88,330
Other	58,704	38,432	46,578	31,298
Total	3,623,175	3,004,171	3,541,536	2,994,607

Nature of Mines.	Accidents Resulting in				Total Accidents entitled to Compensation.	Those Killed left		
	Death.	Permanent		Temporary Disablement.		Widows.	Children.	Other Dependents.
		Complete Disablement.	Partial Disablement.					
Coal	6,020	1,112	11,380	6,638	25,150	3,797	10,317	308
Lignite	617	66	786	502	1,971	469	1,122	23
Metal	870	204	1,741	805	3,620	545	1,366	95
Salt	143	30	271	149	593	110	323	3
Other	71	15	189	70	345	50	110	6
Total	7,721	1,427	14,367	8,164	31,679	4,971	13,238	435

With these figures may be compared 10,518 deaths resulting from accidents in coal mines in the United Kingdom in the ten years, 1885 to 1894, with an average number employed 616,000; and, in metal mines, with an average of 40,000 employees, 581 cases of fatal accident in the same ten years. The proportion of deaths to employees in coal mines is practically identical in this country and in Germany, but higher in metal mines. It should be observed that the above and following tables refer only to the 31,679 cases adjudged entitled to compensation out of the 278,371

cases reported. The expenses incurred due to these 31,679 cases were :—

	During Lifetime of Injured Person.		After Death of Injured Person.	
	Cost of Illness, Assistance to Relatives, and other Payments.	Capital Value of Pensions Payable.	Funeral Expenses and Actual Payments to Widows, &c.	Capital Value of Liabilities to Widows, Orphans, and Relatives.
	Marks.	Marks.	Marks.	Marks.
Coal mining ..	14,895,332	24,906,756	8,556,067	13,937,714
General total.	17,869,204	30,346,730	10,702,387	17,435,807

These costs give the following result :—

	Total Expenses.	Expenses per		
		1 Person Insured.	1,000 Marks of Wages.	1 Case of Accident.
	Marks.	m. pf.	m. pf.	m. pf.
Coal mining ..	61,795,802	25 98	28 29	2,457 10
General total	76,354,127	21 07	25 08	2,410 25

Putting some of the above results otherwise, there were left, per 100 deaths, 64·4 widows, 171·5 children, and 5·6 other dependents; or, per 10,000 insured workers, 13·7 widows, 36·5 children, and 1·2 other dependents. For every 1,000 of the insured, 8·7 cases of compensation occurred, made up of 2·1 deaths, 0·4 of total and 4·0 of partial permanent disablement, and 2·3 of temporary disablement. Of the payments made, 63 per cent. were to injured persons, 37 per cent. to their connections.

In regard to the duration of temporary disablement, the following table shows the distribution of the cases :—

Duration.	Coal Mines.		General Total.		Duration.	Coal Mines.		General Total.	
	Cases.	Per Cent.	Cases.	Per Cent.		Cases.	Per Cent.	Cases.	Per Cent.
Not exceeding 3 months....	1,906	28·71	2,422	29·67	3—4 years....	149	2·24	181	2·22
3— 6 months....	1,193	17·97	1,474	18·05	4—5 „ ...	50	0·75	70	0·86
6— 9 „	957	14·42	1,133	13·88	5—6 „	30	0·45	38	0·47
9—12 „	696	10·49	837	10·25	6—7 „	10	0·15	15	0·18
1—2 years	1,298	19·56	1,564	19·16	7—8 „	4	0·06	5	0·06
2—3 „	344	5·18	424	5·19	8—9 „	1	0·02	1	0·01

Widows to the number of 1,344 and foreigners to the number of 67 were compensated in lump sums averaging respectively 576·23 marks and 770·83 marks. The former cases occur on remarriage of widows, who are then entitled to three times their

annual pension in a lump sum. Hence this pension works out at 192·08 marks per annum. As the rule is that this pension is 20 per cent. of the earnings of, 30 per cent. of the full annual payment to, an injured workman, it follows that the average yearly earnings figure at 960·40 marks, and the average yearly allowance to injured persons 640·27 marks. The total payments and liabilities in the several cases are the following :—

	Actual Payments.	Capitalised Liabilities.	Total.	Estimated Average Duration of Liability.
	Marks.	Marks.	Marks.	Years.
To an injured person not dying	613·61	1,266·66	1,880·27	12
To a widow	601·76	1,819·88	2,421·64	18
„ child	467·43	594·41	1,061·84	10
„ relative	619·53	1,196·43	1,815·96	13

The cost of a fatal accident averages 1·92 times that of a non-fatal case. The proportion of the payments in the non-fatal cases to the full yearly allowances payable are stated in the table which follows. It should be observed that 324 cases are not yet done with, so that the cases contributing to this table are 7,840 in number.

Cases obtaining the Percentages stated of a full Year's Allowance.	Not exceeding 25.	26 to 50.	51 to 100.	101 to 200.	201 to 300.	301 to 400.	401 to 500.	501 to 600.	601 to 700.	Total.
Coal mining—										
Number	3,179	1,509	1,133	416	61	25	2	—	2	6,327
Per cent.	50·25	23·85	17·91	6·57	0·96	0·40	0·03	—	0·03	100
General total—										
Number	3,915	1,889	1,384	528	84	31	4	2	3	7,840
Per cent.	49·94	24·09	17·65	6·73	1·07	0·40	0·05	0·03	0·04	100

In both cases the average payment made works out at 40 per cent. of the full yearly allowance.

Considering next the age of the persons injured, the proportion is found, naturally, to be heaviest in middle life.

Age of Injured Workers.	Under 16.		16—20.		21—30.		31—40.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Coal mining	383	1·5	3,433	13·7	6,963	27·7	6,998	27·8
General total	488	1·5	4,071	12·8	8,635	27·3	8,800	27·8

Age of Injured Workers.	41—50.		51—60.		Over 60.		Unknown.
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.	Number.
Coal mining	4,949	19·7	1,995	7·9	398	1·6	21
General total	6,264	19·8	2,742	8·7	643	2·0	36

The cases appear to become more numerous as the period reported on neared its close.

A refers to Coal Mines. B to the whole group.		1885–86.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.
Number of accidents	A	2,487	2,049	2,315	2,467	2,791	3,287	3,391	3,712	2,651
	B	3,219	2,652	2,983	3,270	3,596	4,043	4,217	4,555	3,144
Number per 1,000 insured	A	9·0	9·2	10·1	10·2	10·6	11·7	11·9	13·0	13·2
	B	7·4	7·6	8·3	8·6	8·9	9·6	9·9	10·8	11·1
Fatal cases	B	981	785	812	836	901	981	837	911	677

The increase of accidents in proportion to numbers of insured persons is very noteworthy. Whether the record is more complete or more trivial accidents than formerly are included, or greater carelessness results from the right to compensation, or for what reason the increase has occurred does not appear. The proportion of fatal cases is clearly less in the later than in the earlier years, and perhaps a reduction of serious accidents has been accompanied by an increase of slighter ones, or by the admission of less serious cases to compensation. During the period eighteen accidents involving at least 10 deaths have occurred. The total of deaths in these eighteen cases was 444, and of injured 98.

The elaborate tables showing the nature of the accidents and the details of the cases of injury by districts and by industries we pass over, and proceed to consider the distribution of responsibility for misfortune. Carelessness of workpeople occupies a much larger place than neglect of employers, but the inevitable risks of the industries are, except in salt works and lignite mines, the most important of the headings of cause assignable. The interest of the subject leads us to give a more detailed table under this head.

Table showing Numbers of Cases of Accident due to various Causes, and of Cost of Compensation, as Percentages of the whole Number and Cost.

Nature of Mine.	Risk proper to the Industry.		Defects, &c., due to Employer.		Fault of Fellow Workmen.		Fault of Injured Person.		Cost per 1,000 Persons Insured.
	Cases.	Cost.	Cases.	Cost.	Cases.	Cost.	Cases.	Cost.	
									Marks.
Coal	61·7	67·8	0·6	0·7	4·6	4·4	32·9	26·8	25,980
Lignite	39·1	47·0	6·6	6·3	4·9	4·4	49·2	41·8	12,510
Metal	51·0	55·9	1·4	1·4	3·8	3·7	43·6	38·9	10,400
Salt	21·9	26·0	6·6	7·3	7·4	7·5	63·4	59·0	18,380
Other	48·7	54·9	2·0	1·3	1·5	0·7	47·8	43·0	12,980
Total	58·2	64·3	1·2	1·3	4·5	4·3	35·9	29·8	—
Cost per 1,000 insured persons	Marks. 13,559		Marks. 266		Marks. 912		Marks. 6,280		Marks. 21,074

There were fifty-seven cases not assigned to either of the above heads. Of the injuries due to the fault or neglect of workpeople, 10·5 per cent. are assigned to slight faults, the remaining 29·9 per cent. to serious faults.

In relative burden of total cost, coal mining stands highest, with a burden, measured by its proportion to wages, of 115 as

compared with 100 for the group. Corresponding relative figures are, for lignite 68, metalliferous mines 59, for salt works 76, and for other minerals 79.

A further item must be added to the payments included in the above totals, namely, the cost of investigation, management, prevention of accidents and contribution to reserve funds prescribed by the law. So far as the latter is concerned, the addition of the estimated capital value of liabilities which has been made above would seem to have been a method of estimating the amount which these reserve funds must ultimately provide for. The addition of capitalised liability averaged 167 marks to every 100 marks actually paid out. The heavy contributions towards the building up of the reserve occur in the earlier years of the existence of the trade associations. These other costs have, in all, amounted to 23,218,949 marks in the nine and a quarter years dealt with. The reserve fund at the end of 1894 was 22,900,700 marks, so that the interest on it has practically covered other expenses up to the present, and will in the future more than suffice for them. These supplementary costs, then, added to the sums already named, make up 99,573,077 marks, or roundly 100 million marks as the cost of the work of the series of years. This is one mark for each 30 marks of estimated wages. The amount stated in the tables give, roughly, one mark to 40 marks of estimated wages.

The output of coal, and of the whole of the mining industry of Germany, is given in our last Statistical Abstract for foreign countries at 4,071 million marks for coal, and 5,598 million marks for the whole produce of mines during the years 1886 to 1894, adding in one quarter of the value assigned to 1885 to make the totals correspond with the figures of the report we are here considering. The proportion of the cost of accident compensation to the value of the produce of the industry is therefore given at close to 1·5 per cent. for coal mining, and rather under 1·4 per cent. for mining generally. Even adding in the miscellaneous costs, and the building up of a reserve fund, the total is not more than 1·8 per cent. for mining in general. The figures of these supplementary expenses are not separately given for the several industries, but it would seem probable that 2 per cent. of the value of the produce would cover the cost of accidents in coal mines.

For comparative purposes, it may be added that the total number of persons insured in the sixty-four associations for various industrial workers, of which the Knappschafts is the largest, was about $5\frac{1}{4}$ millions in 1894, *i.e.*, the mining industry included rather over 8 per cent. of the whole. Agriculture and State employment add nearly 13 millions of insured persons to the number in industrial employment. The total payments to injured persons by these sixty-four associations in 1894 were just over five times the payments in the mining industry, the total reserve funds a little under five times those of the miners. The aggregate wage-total was about nine times that of the Knappschafts. As the largest, and not far from the most liable to accidents entitling to compensation, the mining industry affords figures of very special interest, since the cost in most of the important industries is a much smaller burden than in this.

III.—*Agricultural Returns of Great Britain for* 1897. *Acreage under each kind of Crop, upon the 4th June, in the Years* 1897 *and* 1896, *in each Division of Great Britain;*

	England.		Wales.		Scotland.	
	1897.	1896.	1897.	1896.	1897.	1896.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Total area of land and water[a]	32,543,986	32,543,986	4,773,899	4,773,899	19,453,843	19,453,843
Total acreage under all kinds of crops, bare fallow, and grass[b]	24,793,980	24,831,403	2,833,190	2,834,222	4,892,906	4,896,734
Corn Crops—						
Wheat	1,785,562	1,609,255	53,810	46,973	49,789	37,729
Barley or bere	1,698,323	1,778,779	104,371	107,702	233,096	218,283
Oats	1,829,072	1,845,730	238,510	241,642	968,474	1,008,116
Rye	66,854	64,574	2,383	1,813	7,249	8,457
Beans	213,539	236,634	1,460	1,481	13,913	12,961
Peas	187,432	193,714	1,723	1,537	1,501	1,310
Total	5,780,782	5,728,686	402,257	401,148	1,274,022	1,286,856
Green Crops—						
Potatoes	352,365	400,104	32,609	33,848	119,940	129,789
Turnips and swedes	1,287,664	1,337,153	70,349	71,065	475,132	474,900
Mangold	345,372	328,960	7,842	7,439	1,374	1,324
Cabbage, kohl-rabi, and rape	151,143	148,324	3,166	2,920	12,352	10,861
Vetches or tares	186,604	165,859	2,271	1,739	10,549	10,732
Other green crops	127,335	130,307	1,132	1,253	2,309	2,014
Total	2,450,483	2,510,707	117,369	118,264	621,656	629,620
Clover, sainfoin, and grasses under rotation—						
For hay	1,692,612	1,601,537	196,251	177,455	397,102	392,974
Not for hay	1,193,251	1,094,788	177,787	150,685	1,196,805	1,178,498
Total	2,885,863	2,696,325	374,038	328,140	1,593,907	1,571,472
Permanent pasture or grass not broken up in rotation—[c]						
For hay	3,901,563	3,967,426	473,725	500,565	134,045	170,731
Not for hay	9,290,226	9,386,969	1,456,607	1,475,991	1,255,702	1,224,794
Total	13,191,789	13,354,395	1,930,332	1,976,556	1,390,747	1,395,525
Flax	1,411	1,761	5	4	3	31
Hops	50,863	54,249[i]	—	—	—	—
Small fruit	63,535	69,610	1,043	1,275	5,214	5,360
Bare fallow	369,254	415,670	8,146	8,835	7,357	7,870
	No.	No.	No.	No.	No.	No.
Horses used solely for agriculture[h]	824,123	837,082	88,168	92,444	155,959	155,563
Unbroken horses—						
1 year and above	246,639	250,523	43,794	41,937	35,752	38,166
Under 1 year	98,001	102,433	21,320	21,584	12,668	12,775
Total of horses	1,168,763	1,190,038	153,282	155,965	204,379	206,504
Cows and heifers in milk or in calf	1,823,020	1,808,882	272,627	274,537	436,732	428,256
Other cattle—						
2 years and above	974,306	1,007,242	94,764	94,404	254,160	263,411
1 year and under 2	904,858	863,404	169,990	165,759	285,893	277,150
Under 1 year	865,650	894,075	171,739	178,279	246,758	238,183
Total of cattle	4,567,834	4,573,603	709,120	712,979	1,223,543	1,207,000
Ewes kept for breeding	5,849,201	5,822,028	1,241,084	1,216,955	2,916,412	2,886,604
Other sheep—						
1 year and above	3,533,823	3,762,144	861,611	862,841	1,823,567	1,802,997
Under 1 year	6,338,189	6,446,923	1,092,664	1,128,019	2,683,889	2,776,818
Total of sheep	15,721,213	16,031,095	3,195,359	3,207,815	7,423,868	7,466,419
Sows kept for breeding	281,504	335,932	35,679	39,674	17,061	18,123
Other pigs	1,709,030	2,140,556	180,768	218,024	118,260	126,492
Total of pigs	1,990,534	2,476,488	216,447	257,698	135,321	144,615

[a] Not including foreshore and tidal water.
[b] Not including nursery grounds, woods and plantations, or mountain and heath land.
[c] Exclusive of mountain and heath land.

Bare Fallow, and Grass; and Number of Horses, Cattle, Sheep, and Pigs; as returned with similar Particulars for Ireland, and with Total for the United Kingdom.

Great Britain.		Ireland.		United Kingdom, including Isle of Man and Channel Islands.		
1897.	1896.	1897.	1896.	1897.	1896.	
Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	
56,771,728	56,771,728	20,706,258	20,706,258	77,671,319	77,671,319	Total area of land and water [a]
		[d]	[d]			
32,520,076	32,562,359	15,224,751	15,194,118	47,868,553	47,882,099	Total acreage under all kinds of crops, bare fallow, and grass [b]
						Corn Crops—
1,889,161	1,693,957	46,880	37,919	1,938,956	1,734,118	Wheat
2,035,790	2,104,764	170,634	173,396	2,213,529	2,285,933	Barley or bere
3,036,056	3,095,488	1,175,467	1,193,604	4,226,231	4,303,967	Oats
76,486	74,844	13,047	13,713	89,621	88,634	Rye
228,912	251,076	1,377	1,771	230,429	252,983	Beans
190,656	196,561	440	318	191,326	196,973	Peas
7,457,061	7,416,690	1,407,845	1,420,721	8,890,092	8,862,608	Total
						Green Crops—
504,914	563,741	677,765	705,652	1,194,194	1,281,319	Potatoes
1,833,145	1,883,118	308,942	308,494	2,150,289	2,199,864	Turnips and swedes
354,588	337,723	[e] 54,246	[e] 54,280	409,501	392,591	Mangold
166,661	162,105	[f] 46,217	[f] 50,217	213,043	212,467	Cabbage, kohl-rabi, and rape
199,424	178,330	4,212	4,292	203,955	182,898	Vetches or tares
130,776	133,574	24,027	24,782	156,586	160,125	Other green crops
3,189,508	3,258,591	1,115,409	1,147,717	4,327,568	4,429,264	Total
						Clover, sainfoin, and grasses under rotation—
2,285,965	2,171,966	637,206	654,894	2,937,607	2,840,372	For hay
2,567,843	2,423,971	614,284	664,766	3,215,191	3,120,077	Not for hay
4,853,808	4,595,937	1,251,490	1,319,660	6,152,798	5,960,449	Total
						Permanent pasture or grass not broken up in rotation— [c]
4,510,333	4,638,722	1,539,308	1,547,311	6,055,699	6,193,988	For hay
12,002,535	12,087,754	9,844,971	9,668,128	21,869,011	21,779,700	Not for hay
16,512,868	16,726,476	11,384,279	11,215,439	27,924,710	27,973,688	Total
1,419	1,796	45,576	72,301	46,995	74,098	Flax
50,863	54,249 [i]	—	—	50,863	[i] 54,249	Hops
69,792	76,245	— [g]	— [g]	[g] 70,245	[g] 76,797	Small fruit
384,757	432,375	20,152	18,280	405,282	450,946	Bare fallow
No.	No.	No.	No.	No.	No.	
1,068,250	1,085,089	— [g]	— [g]	— [g]	— [g]	Horses used solely for agriculture [h]
						Unbroken horses—
326,185	330,626	— [g]	— [g]	— [g]	— [g]	1 year and above
131,989	136,792	— [g]	— [g]	— [g]	— [g]	Under 1 year
1,526,424	1,552,507	534,133	553,320	2,070,261	2,115,557	Total of horses
2,532,379	2,511,675	1,434,476	1,429,735	3,984,353	3,959,087	Cows and heifers in milk or in calf
						Other cattle—
1,323,230	1,365,057	1,013,096	1,000,257	2,341,158	2,370,057	2 years and above
1,360,741	1,306,313	964,891	957,794	2,334,771	2,273,796	1 year and under 2
1,284,147	1,310,537	1,051,472	1,019,955	2,344,367	2,339,483	Under 1 year
6,500,497	6,493,582	4,463,935	4,407,741	11,004,649	10,942,423	Total of cattle
10,006,697	9,925,587	2,466,353	2,432,354	18,729,078	18,821,437	Ewes kept for breeding
6,219,001	6,427,982					Other sheep—
10,114,742	10,351,760	1,691,228	1,648,340	11,838,035	12,032,372	1 year and above
						Under 1 year
26,340,440	26,705,329	4,157,581	4,080,694	30,567,113	30,853,809	Total of sheep
334,244	393,729	— [g]	— [g]	— [g]	— [g]	Sows kept for breeding
2,008,058	2,485,072	— [g]	— [g]	— [g]	— [g]	Other pigs
2,342,302	2,878,801	1,327,226	1,405,508	3,683,403	4,301,328	Total of pigs

[d] Furnished by the Registrar-General for Ireland.
[e] Including beetroot.
[f] Cabbage and rape only.
[g] Not separately shown for Ireland.
[h] Including mares kept for breeding.
[i] Including 32 acres originally returned in error.

Produce of Wheat, Barley, and Oats. Preliminary Statement showing the Estimated Total Produce and Yield per Acre of Wheat, Barley, and Oats in Great Britain in the Year 1897, *with Comparative Statements for the Year* 1896, *and for the Average of the Ten Years* 1887-96.

WHEAT.

	Estimated Total Produce.		Acreage.		Estimated Yield per Acre.		Average of the Ten Years 1887-96.
	1897.	1896.	1897.	1896.	1897.	1896.	
	Bshls.	Bshls.	Acres.	Acres.	Bshls.	Bshls.	Bshls.
England	51,697,650	54,523,269	1,784,206	1,609,255	28·98	33·88	29·52
Wales	1,332,192	1,078,090	53,810	46,973	24·76	22·95	23·35
Scotland	1,883,388	1,451,593	49,789	37,729	37·83	38·47	35·64
Great Britain.	54,913,230	57,052,952	1,887,805	1,693,957	29·09	33·68	29·49
	BARLEY.						
England	55,148,526	59,843,547	1,697,782	1,778,779	32·48	33·64	32·81
Wales	3,116,438	2,823,170	104,371	107,702	29·86	26·21	28·89
Scotland	8,538,915	8,108,059	233,096	218,283	36·63	37·14	35·51
Great Britain.	66,803,879	70,774,776	2,035,249	2,104,764	32·82	33·63	32·82
	OATS.						
England	73,604,275	69,402,150	1,828,015	1,845,730	40·26	37·60	40·12
Wales	7,765,962	7,179,786	238,510	241,642	32·56	29·71	32·26
Scotland	35,442,224	37,433,971	968,474	1,008,116	36·60	37·13	36·12
Great Britain.	116,812,461	114,015,907	3,034,999	3,095,488	38·49	36·83	38·13

IV.—*Notes on Economical and Statistical Works.*

A Great Agricultural Estate: being the Story of the Origin and Administration of Woburn and Thorney. By the Duke of Bedford. 247 pp. Murray, 1897.

Woburn and Thorney came to the Bedfords from Edward VI, and their area is practically the same now as it was under that monarch. The Fen country (and Thorney is all in the Fen country) "had been reclaimed from the sea long before the days of the Bedford level" (37), but the Bedford level, which came into existence in the seventeenth century, was a drained and arable soil, instead of a waste of weeds and water.

Only 300 acres out of the whole 17,760 of Thorney were arable land in the sixteenth century (44, compare 9). The rest were reclaimed, at a cost of 100,000*l.*, by the Bedfords; and the preservation and improvement of Thorney have cost the family 983,640*l.* in the period from 1816 to 1895, the period chiefly considered in this book (48, and Appendix). In these eighty

years the taxation has amounted to 614,714*l.*, or nine-tenths of the net income (48). In recent years there has been little or no net income. "Low prices, bad seasons, and a crushing weight of taxation have entirely caused rent, as understood by the political economist, to disappear from the Thorney estate. At the same time the average net income for the past twenty years, even without taking the death duties into account, is only equal to $2\frac{1}{7}$ per cent. interest on the capital outlay on new works" (49).

The Estate Act of 1894 is not blessed by the writer, in spite of Sir William Harcourt's admission (64) that "the Duke of Bedford is one of the best landlords in England." The Duke is moved to say that, as "taxation, however spread, however disguised, falls eventually on the shoulders of the industrial classes," so "a tax on land falls sooner or later on the labouring classes" (60). This is very doubtful theory, even when supported by the authority of Mr. John Morley (*ibid.*). The Duke has the excusable bias of the *mens conscia recti* troubled by the tax gatherer. The sanitary authorities have shifted him from one plan of cottage drainage to another, and yet another (70); the overseers have at once rated his improvements (72). But the imperial taxes seem to cause more distress than they all. "The Inland Revenue takes no heed of what is done with income" (74).

True; but it would be difficult to discriminate in taxation between the righteous and the unrighteous. If for example the possessor of an income of 2,000*l.* could show that he spent 1,000*l.* of it in wise charity, it would still be invidious to exempt him from taxation on half his income. People who know they are spending their money for the public benefit may naturally grudge it to the treasury, feeling sure that the treasury cannot spend it better, and may easily spend it worse. But, apart from all financial theory, it must be said that the generality of men and of landlords are not public spirited, and legislation must regard the generality, not the exceptions.

If we turn to the chapters on allotments and small holdings, we find an extremely useful record of the Duke's experience. "It has always been a point of honour with my predecessors to cooperate loyally with the legislature in respect to measures affecting the land" (129). Accordingly, on the passing of the Local Government Act of 1894, the Bedfords offered their existing allotments to the parish councils. Thirteen councils had the offer, and declined it, some in very complimentary terms (130, 156). The new Act contemplated one acre of arable land with three acres of pasture as the desirable extent of an allotment. The Duke's experience is that a quarter of an acre is enough, as a vegetable garden for the labourer's family, the larger area tempting him into the market, and exposing him therefore to all the risks of the market, as "the rival of the farmer and the market gardener" (134). Still, the Duke is anxious to give the Act a fair trial. As to small holdings (of 25 acres or so) he has little but praise for them, and finds the rents well paid and the tenants as a rule prosperous (148—55).

The rest of the book deals with experimental farms and farms

in hand. The programme of study at the Woburn Farm School is given (p. 178). The school is one of the many proofs of the zeal of the Bedfords for agricultural improvement. It is interesting to know that "the laying down of land to grass," while "prejudicial to the welfare of the agricultural labourers," has not as yet been decidedly profitable to the landlord; and it would seem that the remedy for agricultural depression must be sought elsewhere.

Indian Coinage and Currency By L. C. Probyn. 8vo., 125 pp. London: Effingham Wilson, 1897.

Mr. Lesley Probyn has judged the present time opportune for bringing together a number of papers on Indian Currency which he has read before societies or published in the *Asiatic Quarterly Review* in 1888 and subsequent years. His plan for a gold standard for India is sufficiently well known, but the various aspects of the question can be better studied by reading the different papers in connection with each other. The necessity of a gold reserve in India if the gold standard is to become a reality; and the insistance on the fact that if the conversion of the currency into gold and of gold into currency is secured, even only in large sums, the currency becomes based on gold and valued at a gold rate are the main points brought out. The author proposes that currency notes of 10,000 rupees should be payable in gold (in bars), and those of less denominations only in silver coin. Gold might be received in smaller quantities, though only paid in the larger ones. When a sufficient reserve should be accumulated, the limit of 10,000 rupees might be reduced. A statement of the Indian coinage and currency laws now in force, and a draft of a Bill to amend them in accordance with the author's ideas, are given. A diagram is also included showing the movements of the gold value of silver and of the rupee from the beginning of 1892 till September, 1897.

It is not easy to follow the reasoning which admits that, with closed mints, the volume of the currency is an important factor in regulating its value, but denies, or at least doubts, it with open mints. This does not, however, seriously affect the argument in this volume.

The Reform of Currency. 8vo. 77 pp. *2s. 6d.* London: Effingham Wilson, 1897.

The anonymous author of this tract propounds a scheme for an international system of inconvertible paper currency. In outline the scheme is as follows: A board of international currency would be constituted, of one or more representatives from each nation which should become a party to the scheme. This board would authorise the issue in any one of the countries of notes to the amount required for carrying out some reproductive public work which should be desired in that country; these reproductive public works would require to receive the sanction of the board, and the estimates for their cost would need to be approved by it. The rates of exchange between different currencies and the

necessary details connected with the issue, such as the face value of the notes, &c., &c., would also be determined by the board. No addition to the currency of any one of the contracting nations would be made except on the guarantee to carry out such approved works as referred to.

The author maintains that such a currency would be effectively restrained from being excessive in quantity, that it would be capable of expansion in proportion to need more securely than a metallic currency, that its value would be steadier and that it would be more economical than the metallic currencies which it would ultimately displace. Being international, moreover, the difficulties and uncertainties of the exchanges would be avoided. For his arguments on these points we refer readers to the pamphlet.

An Essay on Value, with a short account of American Currency. By John Borden. Crown 8vo., 232 pp. Chicago: Rand, McNally and Co., 1897.

A clear statement of the leading principles of the modern doctrine of value, and an emphatic condemnation of the American system of bank-note issue make up this small volume. There is a little exaggeration of the rigidity of the assumptions on which the older teaching was based, a rather too vigorous assertion of errors of economists. It is, perhaps, necessary to insist on the existence of great individual differences within industrial groups commonly treated as homogeneous. It is desirable, nevertheless, to recognise the fact that general resemblance is more important in some connections than the variation among individuals. On the whole, the exposition of the theory of value, containing nothing new it is true, directs attention plainly to the really important features of the modern conception of the doctrine.

A very brief history of the paper currencies of the United States follows, and the purpose of the author appears to be to dwell on the smaller cost to the nation which would result from issuing all the notes from a public department, instead of having the circulation of National Bank notes based on interest-bearing debt. He contends that the currency would not thereby lose elasticity.

A brief Introduction to the Infinitesimal Calculus. By Irving Fisher, Ph.D. Globe 8vo., 84 pp. 75 cents. New York: The Macmillan Company, 1897.

This brief manual by one of the most distinguished of the younger economists, is intended for the use of those who desire to comprehend the economic discussions which are presented in mathematical form. It appears, however, to us that it has a serious defect. It assumes too much knowledge on the part of the reader. The conception of a limit, of the sum of an infinite series, and of what is meant by continuity, need more careful presentation than Dr. Fisher accords them. Something resembling the first twenty pages of Professor Lamb's recent work on *Infinitesimal Calculus* would have formed an excellent introduction to this small

volume without too greatly increasing its bulk. Our own experience with the class for whom the book is intended suggests the necessity for something of this kind. The treatment of differential coefficients as real fractions, decomposable into numerator and denominator, though perhaps rendering some part of what follows easier to grasp, is a faulty method of presenting the fundamental idea. In using this method, Dr. Fisher follows some eminent examples, but not such as are to be taken as the best models.

The manner of presentation of the matter of the book is clear, and the plentiful illustration by judiciously selected examples should help the beginners for whom it is devised. It is a happy thought to prepare a volume of this kind to appear when the English edition of Cournot's work will cause many to desire such concise information as it contains to enable them to enjoy this renowned treatise. We doubt (we regret to say it) whether those who know enough to understand Dr. Fisher's explanations will not find some, if not most, of them superfluous; while those to whom it would be invaluable will find a serious chasm between the limits of their knowledge and the point selected as a beginning for this book. This gap might be filled in without much difficulty if Dr. Fisher should be inclined to recognise its existence.

Note sur le Minimum de Salaire dans les Travaux Publics. 4to., 129 pp. Paris: Office du Travail, 1897.

The French Labour Department issues under the above title a statement of the position of the question of a "minimum wage" in works carried out by public authorities, or for them by contractors. The information gathered relates to England, Belgium, Holland, Switzerland, the United States, and France. For England official reports, and information obtained from the Clerk to the London School Board, furnish the material. The statements of present conditions are accompanied by indications of the process of development of public opinion on the question. A similar course is adopted for Belgium. Here, we learn, the first adoption of the minimum-wages clause was by the communal council of Saint Joose-ten-Noode in 1887, and that, of the eighty-seven communes of over 8,000 inhabitants each, fifty-one, with about two millions of inhabitants altogether have adopted, the remaining thirty-six, with about half-a-millon inhabitants, have not adopted the clause. From the information relating to Holland we learn that, in 1894, Amsterdam received contracts on two bases for a number of public works. In some cases conditions as to terms of employment of labour were accepted, in others these matters were left open. The quite trifling average difference between contracts on the two bases is remarkable. The difference in the lowest contracts on the two bases amounted to about $1\frac{1}{4}$ per cent. of the cost of some fourteen works thus contracted for during the year.

In Switzerland, Zurich alone is reported to have adopted a minimum-wage clause. For the United States the Commissioner

of Labor's report on *Labor Laws of the United States* of 1896 furnishes the information.

In the portion dealing with France an interesting record of the manner in which the importance of the matter developed, showing the differences between the question in England and in Belgium, and as it arose in Paris, is given. After deciding in July, 1888, to impose conditions including a minimum wage in contracts, the Conseil d'État interfered, and, after some attempts at resistance, these conditions were declared *ultra vires* on 25th January, 1895.

Credito Capitalistico e Moneta Nazionale. By Professor Giacomo Luzzati. 8vo., 205 pp. Milan: Ulrico Hoepli, 1897.

Signor Luzzati has followed up his previous studies on money and its relation to value by the further essay bearing the title given above. It bears throughout the marks of wide reading and careful comparison of the views of numerous authors. In the first part the development of human society through its various forms is briefly traced for the purpose of showing the influence of the principles under examination. The conclusion of the argument is the need of a national money capable of adapting itself to the movements of national wealth, expanding and contracting as required, and thus avoiding giving rise to variations of prices which may become the bases of commercial speculation and crises. The nature of money is examined at length in the second part of the volume, history being again called to the help of abstract considerations. The Bank of France alone in our time gives an example, even approximate, of what is needed, in supplying a currency sufficiently elastic and capable of the necessary increase or decrease with national needs. Such is the author's view. Notes must be convertible to provide the necessary guarantee against over-issue, but this does not necessitate a practice like the English. The metallic guarantee should succeed, not precede, emission. The note should give rise to its own guarantee.

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Economic Review. October, 1897—The Workmen's Compensation Act: *H. W. Wolff.* Is Co-operation a Failure?: *J. M. Ludlow and W. E. Snell.* Socialism and Individualism: a Challenge and an Eirenicon: *S. Ball.*

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FRANCE—

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September—De l'état présent et prochain de l'ouvrier américain: *E. Levasseur* (*conclusion*).

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Vierteljahrshefte zur Statistik des Deutschen Reichs, 1897. *Heft* 4.—Konkurs-Statistik für das Jahr 1896. Zur deutschen Justizstatistik für das Jahr 1896. Die Bergwerke, Salinen und Hütten während des Jahres 1896. Zur Volkszählung 1895. Die jugendlichen Fabrikarbeiter und die Fabrikarbeiterinnen im Jahre 1896. Saatenstands- und vorläufige Ernte- Nachrichten für das Jahr 1897.

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Statistische Monatschrift, August—September Heft, 1897—Die Eheschliessungen in Oesterreich im Jahre 1895: *Dr. F. v. Meinzingen.* Wie wird in Wien der Anzeigepflicht Infectionskranker nachgekommen: *Dr. S. Rosenfeld.* Die überseeische österreichische Wanderung in den Jahren 1892 bis 1895: *H. v. Mayr.* Studentenstiftungen im Jahre 1896: *Bratassević.*

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Bulletin Russe de Statistique Financière et de Législation. July —September, 1897—Statistique, au 1er Jan., 1898, des valeurs mobilières créés en Russie. Capital nominal, valeur originaire, revenu net et valeur vénale. La Dette publique de l'Empire au 1er Jan., 1898. La taxe de 5% sur le revenu des fonds d'État, des obligations et lettres de gage de toute nature et des actions de chemins de fer. Statistique des salaires.—Les chemins de fer russes pendant les 13 dernières années. Banque des paysans.—Les operations depuis la fondation jusqu'au 31er Déc., 1895. Chemins de fer de l'État.—Recettes et dépenses de 1896 considérées dans leurs rapports avec l'exécution du budget de l'État pour l'ex. 1896.

V.—*Quarterly List of Additions to the Library.*

Additions to the Library during the Quarter ended 15th December, 1897, *arranged alphabetically under the following heads:*—(a) *Foreign Countries;* (b) *India and Colonial Possessions;* (c) *United Kingdom and its Divisions;* (d) *Authors, &c.;* (e) *Societies, &c.* (*British*).

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Riksstat för år 1898. Sm. 4to	
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(Corrected to 31st December, 1897.)

ROYAL STATISTICAL SOCIETY.

(FOUNDED 1834. INCORPORATED 1887.)

9, ADELPHI TERRACE,
STRAND, W.C., LONDON.

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1898.

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9, Adelphi Terrace, Strand, W.C., London.

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HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

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ROYAL STATISTICAL SOCIETY.

No. 9, Adelphi Terrace, Strand, W.C., London.

NOTICES TO FELLOWS.

December, 1897.

The Council desire to call the attention of the Fellows to the fact that notwithstanding the change in the name of the Society by the addition of the word "Royal," they are still, in using letters after their names, signifying the membership of the Society, only entitled under Rule 6, to use the letters F.S.S.

Annual Subscriptions are due in advance, on the 1st of January in each year. A Form for authorising a Banker or Agent to pay the Subscription Annually will be forwarded by the Assistant Secretary, on application. When convenient, this mode of payment is recommended. Drafts should be made payable to the order of "The Royal Statistical Society," and crossed "*Drummond and Co.*"

To be included in the Ballot at any particular Ordinary Meeting, the Nomination Papers of Candidates for Fellowship, must be lodged at the Office of the Society, at least six days before the date of such Meeting.

Fellows who may desire to receive Special and Separate Notices of each Paper to be read before the Society at the Ordinary Meetings, should indicate their wishes to the Assistant Secretary.

The Ordinary Meetings of the Society, during the Session 1897-98, will be held at 5 p.m., except the first two Meetings, when the Chair will be taken at 5.30 p.m., in **The New Lecture Theatre of the Royal United Service Institution, Whitehall, S.W.**

Fellows are entitled to a copy of the Catalogue of the Library and of the Index to the Catalogue. They may be had on personal application at the office, or will be forwarded upon the payment of carriage (1*s.* per parcel post). Fellows residing abroad or in the colonies are requested to send the necessary amount to cover postage, according to postal circumstances. (Weight, 3 lb. 14 oz. and 2 lb. 10 oz. respectively.)

The Library and the Reading Room are open daily for the use of Fellows from 10 a.m. to 5 p.m., excepting on Saturdays, when they are closed at 2 p.m.

Fellows borrowing books from the Library are requested to be good enough to return them with as little delay as possible, but without fail at the expiration of a month, and without waiting for them to be recalled.

Fellows changing their Addresses are requested to notify the same to the Assistant Secretary, so that delay or error in forwarding communications, or the *Journal*, may be avoided.

By Order of the Executive Committee.

CALENDAR FOR THE SESSION 1897-98.

1897	MON.	TUES.	WED.	THURS.	FRI.	SATUR.	SUN.
NOV.	1	2	3	4	5	6	7
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	31						

The dates of the Ordinary Meetings of the Society, at which Papers are read and discussed, are marked in the Calendar above by **Black Figures.**

These Meetings are held in **The New Lecture Theatre of the Royal United Service Institution, Whitehall, S.W.**

THE ANNUAL GENERAL MEETING
WILL BE HELD ON TUESDAY, THE 21ST JUNE, 1898.

ROYAL STATISTICAL SOCIETY.

Programme of the Session 1897-98

THE

ORDINARY MEETINGS

WILL BE HELD

IN THE MONTHS OF NOVEMBER TO JUNE,

In the LECTURE THEATRE of the

ROYAL UNITED SERVICE INSTITUTION,

WHITEHALL, S.W.

Tuesday, Nov.	16, 5.30 p.m.	Tuesday, March	15, 5 p.m.
,, Dec.	14, 5.30 ,,	,, April	19, 5 ,,
,, Jan.	18, 5 ,,	,, May	17, 5 ,,
,, Feb.	15, 5 ,,	,, June	21, 5 ,,

The following Papers have been read (Dec., 1897) :—

"Notes on the subjects discussed at the St. Petersburg Meeting of the International Statistical Institute." By MAJOR P. G. CRAIGIE (Hon. Foreign Secretary.) (Read 16th November.)

"Jevons's Coal Question: Thirty Years after." Inaugural Address of the President, The RIGHT HON. LEONARD H. COURTNEY, M.P. (Read 14th December.)

The following Papers have been offered; and from these and from others that may yet be offered, a selection will be made by the Council :—

"Foreign Trade of our Colonies." By SIR GEORGE BADEN-POWELL, K.C.M.G., M.P.

"Old Age Pensions." By SIR HENRY C. BURDETT, K.C.B.

"Female Employment in Factories, with special reference to its effects on the health of the employed and of their children. By MISS CLARA E. COLLET, M.A.

"Further Notes on the Utility of Common Statistics. By SIR ROBERT GIFFEN, K.C.B., F.R.S.

"Local Taxation in London. By G. LAURENCE GOMME, F.S.A.

"Poor Relief in Scotland; its statistics and development: 1791 to 1891. By C. S. LOCH, B.A.

"Life Tables, and the Registrar-General's Mortality Statistics. By A. C. WATERS.

ROYAL STATISTICAL SOCIETY,

AN OUTLINE OF ITS OBJECTS.

THE *Royal Statistical Society* was founded, in pursuance of a recommendation of the British Association for the Advancement of Science, on the 15th of March, 1834; its objects being, the careful collection, arrangement, discussion and publication, of facts bearing on and illustrating the complex relations of modern society in its social, economical, and political aspects,—especially facts which can be stated numerically and arranged in tables;—and also, to form a Statistical Library as rapidly as its funds would permit.

The Society from its inception has steadily progressed. It now possesses a valuable Library of over 30,000 volumes, and a Reading Room. Monthly meetings are held from November to June, which are well attended, and cultivate among its Fellows an active spirit of investigation; the Papers read before the Society are, with an abstract of the discussions thereon, published in its *Journal*, which now consists of sixty annual volumes, and forms of itself a valuable library of reference.

The Society has originated and statistically conducted many special inquiries on subjects of economic or social interest, of which the results have been published in the *Journal*, or issued separately.

To enable the Society to extend its sphere of useful activity, and accomplish in a yet greater degree the various ends indicated, an increase in its numbers and revenue is desirable. With the desired increase in the number of Fellows, the Society will be enabled to publish standard works on Economic Science and Statistics, especially such as are out of print or scarce, and also greatly extend its collection of Foreign works. Such a well-arranged Library for reference, as would result, does not at present exist in England, and is obviously a great *desideratum*.

The Society is cosmopolitan, and consists of Fellows and Honorary Fellows, forming together a body, at the present time, of about *one thousand* Members.

The Annual Subscription to the Society is *Two Guineas*, and at present there is no entrance fee. Fellows may, on joining the Society, or afterwards, compound for all future Annual Subscriptions by a payment of *Twenty Guineas*.

The Fellows of the Society receive gratuitously a copy of each part of the *Journal* as published Quarterly, and have the privilege of purchasing back numbers at a reduced rate. The Library (reference and circulating), and the Reading Room, are open daily, for the convenience of Members.

Nomination Forms and any further information will be furnished, on application to the *Assistant Secretary*, 9, *Adelphi Terrace, Strand, W.C., London.*

ROYAL STATISTICAL SOCIETY.

LIST OF THE SOCIETY'S PUBLICATIONS.

Note.—Sets—or Copies of any number—of the *Journal*, or of the other Publications of the Society (if not out of print), can be obtained of the publisher, E. Stanford, 26 and 27, Cockspur Street, Charing Cross, London, S.W., or through any bookseller.

	Price.
Proceedings— 308 pp. 1 vol. 8vo. 1834-37	(Out of print)
Transactions— Vol. 1, part 1. 148 pp. 4to. 1837	"
Journal (published quarterly)— Vols. 1—60. 8vo. 1838-97	5*s.* each part*
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By different resolutions of the Council, the prices charged to Members are as follows:—(a.) back numbers of the *Journal* of the Society, three-fifths of the publishing price; (b.) each part of the General Index to the *Journal*, 2*s.* 6*d.*; (c.) the Jubilee Volume, 5*s*; (d.) the Subject Index, 1*s.*

NOTE.—One or two numbers of the *Journal* are now out of print.
* Before 1870 the price varied.

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ROYAL STATISTICAL SOCIETY.

Founded 15th March, 1834, Incorporated 31st January, 1887.

LIST OF THE FORMER

Patrons and Presidents of the Society.

Patron.

	Period.
His Royal Highness The Prince Consort, K.G.	1840–61

Presidents.

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The Right Hon. the Earl Fitzwilliam, F.R.S.	1847–49
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The Right Hon. Sir J. S. Pakington, Bart., M.P., G.C.B. (afterwards Lord Hampton.)	1861–63
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T. Graham Balfour, M.D., F.R.S.	1888–90
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Charles Booth	1892–94
The Right Hon. the Lord Farrer	1894–96
John Biddulph Martin, M.A., F.R.S.	1896–97
Alfred Edmund Bateman, C.M.G.	1897

LIST OF FELLOWS.

*Those marked thus * have compounded for their Annual Subscriptions.*

The names of Members of Council are printed in SMALL CAPITALS.

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1888	Acland, The Right Hon. Arthur Herbert Dyke, M.A., M.P., 28, *Cheyne-walk, Chelsea, S.W.*
1869	Acland, The Rt. Hon. Sir Thomas Dyke, Bart., F.R.G.S., *Killerton, Exeter.*
1892	Acworth, William M., M.A., 47, *St. George's-square, S.W.*
1879	Adam, Robert, 2, *Gillsland-road, Edinburgh.*
1891	Addington, Right Hon. Lord, 24, *Princes-gate, S.W.*
1890	Adler, Marcus Nathan, M.A., F.I.A., 1, *Bartholomew-lane, E.C.; and* 22, *Craven-hill, W.*
1884	Agius, Edward Tancred, 52, *Belsize-park-gardens, N.W.*
1886	Ailesbury, The Most Hon. The Marquess of, 36, *Eaton-place, S.W.; and Savernake, Wilts.*
1876	Aitchison, William John, 2, *Princes-street, E.C.*
1879	Akers-Douglas, The Right Hon. Aretas, M.P., J.P., *Chilston Park, Maidstone, Kent.*
1876	Aldwinckle, Thomas Williams, 1, *Victoria-street, S.W.*
1896	Allan, Francis John, M.D., 5, *Tavistock-street, Strand, W.C.*
1887	Allard, Alphonse (*Hon. Director of Belgian Mint*). 52, *Avenue Louise, Brussels, Belgium.*
1889	Allen, Frank, J.P., *Guildford-terrace, off Hill-st., Thorndon, Wellington, N.Z.*
1896	Allen, George Berney, *Cawnpore, N.W.P., India; and* 13, *Princes-gardens, S.W.*
1876	Allen, John T. R., 41, *Norfolk-square, Brighton.*

Year of Election.	
1893	Anderson, Herbert William, *Halling, Kent.*
1889	Anderson, John Andrew (Alderman), *Faversham, Kent.*
1886	Andras, Henry Walsingham, F.I.A., 25, *Pall Mall, S.W.*
1890	*Andrews, Henry, 18, *Essex-street, Strand, W.C.*
1871	Angus, R. B., *Montreal, Canada.*
1890	Ann, Alfred E., F.R.G.S., *The Oaks, Snaresbrook, Essex.*
1897	Anning, Edward Herbert, F.R.G.S., 78, *Cheapside, E.C.*
1884	Anning, Edward James, 78, *Cheapside, E.C.*
1895	Arbuthnot, Gerald Archibald, 52, *Eaton-place, S.W.; and* 4, *Whitehall-place, S.W.*
1872	*Archibald, William Frederick A., M.A., 4, *Brick-court, Temple, E.C.*
1892	Argyle, Jesse, 67, *Mildmay-park, N.*
1897	Arnold, William, 11, *Albion-street, Hanley, Staffs.*
1888	Asch, William, 4, *Albert Mansions*, 118, *Victoria-street, S.W.*
1883	Aschenheim, Gustav, 27, *Mincing-lane, E.C.*
1891	Ashman, Rev. Joseph Williams, M.A., M.D., *National Club*, 1, *Whitehall-gardens, S.W.*
1888	Atkinson, Charles, 61, *Margravine-gardens, West Kensington, W.*
1893	Atkinson, Frederick J. *Deputy Accountant General, Calcutta, India.*
1871	Atkinson, George W., 13, *Regent-street, Barnsley.*
1892	*Atkinson, Robert Hope, *New York Life Insurance Co., Place d'Armes, Montreal.*
1893	Aves, Ernest, M.A., 18, *Primrose-hill-road, N.W.*
1872	*Babbage, Major-General Henry Prevost, *Mayfield, Lansdown, Cheltenham.*

Year of Election.	
1872	*Backhouse, Edmund, *Trebah, Falmouth.*
1892	Bacon, George Washington, F.R.G.S., 127, *Strand, W.C.*
1879	Baden-Powell, Sir George, K.C.M.G., M.P., 114, *Eaton-square, S.W.*
1855	Bailey, Arthur Hutcheson, F.I.A., 26, *Mount Ephraim-road, Streatham, S.W.*
1890	Bain, William Whyte, 7, *King-street, Cheapside, E.C.*
1881	Baines, Jervoise A., C.S.I. (*Hon. Secretary*). 23, *Kensington Park-gardens, W.; and India Office, S.W.*
1887	Baldwin, Alfred, M.P., J.P., *Wilden House, near Stourport.*
1878	Balfour, The Right Hon. Arthur J., P.C., M.P., LL.D., F.R.S., 10, *Downing-street, S.W.*
1886	Balfour, The Right Hon. Gerald William, M.P., 24, *Addison-road, Kensington, W.*
1881	*Barfoot-Saunt, William Henry, *Market Harborough, Leicestershire.*
1884	Barlow, William Henry, F.R.S., C.E., *High Combe, Old Charlton, Kent.*
1887	Barnes, Joseph Howard, F.I.A., 70, *Lombard-street, E.C.*
1889	Barr, Andrew Wallace, 30, *Moorgate-street, E.C.*
1885	Barratt, Thomas J., 75, *New Oxford-street, W.*
1887	*Barrett, Thomas Squire, F.Z.S., M.A.I., F.R. Hist. Soc., *Wistaria House, Berkhamsted.*
1878	Barry, Francis Tress, M.P., *St. Leonard's-hill, Windsor.*
1888	*Bartlett, Frederick W., 82, *Camberwell Grove, S.E.*
1889	Bastable, Professor C. F., M.A., LL.D., 6, *Trevelyan-terrace, Brighton-road, Rathgar, Co. Dublin.*
1873	Bate, George, 258, *Waterloo-road, Burslem, Staffs.*
1877	Bateman, Alfred Edmund, C.M.G. (*Hon. Vice-President*), *Board of Trade, Whitehall-gardens, S.W.*
1888	Batten, John W., 3, *Harcourt Buildings, Temple, E.C.*
1877	Bayfield, Arthur, 95, *Colmore-row, Birmingham.*
1873	*Baynes, Alfred Henry, F.R.G.S., 19, *Furnival-street, Holborn, E.C.*
1871	*Baynes, William Wilberforce, F.I.A., *Pickhurst Wood, Bromley, Kent.*
1875	*Beardsall, Francis E. M., 63, *Brown-street, Manchester.*

Year of Election

1875 *Beaufort, William Morris, F.R.A.S., F.R.G.S.,
18, *Piccadilly, W.*

1882 *Beazeley, Michael Wornum, M.A.,
194, *Clapham-road, S.W.*

1884 Bedford, James,
Woodhouse Cliff, Leeds.

1889 Beecroft, William Henry,

1882 *Beeton, Henry Ramie (6*a*, *Austin Friars*, *E.C.*),
9, *Maresfield-gardens*, *Hampstead N.W.*

1886 Begg, Ferdinand Faithfull, M.P.,
Bartholomew House, *E.C.*

1890 Bell, Frederick, F.I.A.,
9, *King-street*, *Cheapside*, *E.C.*

1892 Bell, Frederick William,
P.O. Box 916, *Johannesburg*, *S. Africa.*

1884 Bell, James T.,
Northcote, *Dowanhill*, *viâ Glasgow.*

1897 Bennett, William,
Australian Temperance & Gen. Life Ass. Soc., *Melbourne.*

1888 *Benson, Godfrey R.,
23, *The Grove*, *Boltons*, *S.W.*

1895 Bentinck, Lord Henry, M.P.,
13, *Grosvenor-place*, *S.W.*

1884 *Bentley, Richard, F.R.G.S.,
Upton, *Slough*, *Bucks*

1884 Berg, Wilhelm,
37, *Mincing-lane*, *E.C.*

1890 Berry, Arthur, M.A.,
King's College, *Cambridge.*

1891 Berry, Oscar, F.C.A.,
Monument-yard, *E.C.*

1875 Bevan, Thomas,
Stone Park, *near Dartford*, *Kent.*

1869 *Beverley, The Hon. Mr. Justice Henry,

1879 *Bickford-Smith, William, J.P., D.L.,
Trevarno, *Helston*, *Cornwall.*

1891 Biddle, Daniel, M.R.C.S., L.S.A.,
Charlton Lodge, *Kingston-on-Thames.*

1897 Biggs, John Thomas, J.P.,
Orby-villas, *Mecklenburg-street*, *Leicester.*

1886 Biggs, Thomas Hesketh,
The Treasury, *Calcutta*, *India.*

1888 Billinghurst, Henry F.,
41, *Lothbury*, *E.C.*

1892 *Birkmyre, William,
Reform Club Chambers, *Pall Mall*, *S.W.*

Year of Election.	
1881	Bishop, George, 113, *Powis-street, Woolwich.*
1883	Blades, R. H., 23, *Abchurch-lane, E.C.*
1884	Boileau, John Peter H., M.D., &c. (*Brigade-Surgeon Lieut.-Col.*) *Trowbridge, Wilts.*
1881	Bolitho, Thomas Robins, *Trengwainton, Hea Moor, R.S.O., Cornwall.*
1887	Bolling, Francis, 2, *Laurence Pountney-hill, E.C.*
1890	Bolton, Edward, J.P., *Clifton House, Beverley-road, Hull.*
1880	Bolton, Joseph Cheney, *Carbrook, Larbert, Stirlingshire.*
1885	*Bonar, James, M.A., LL.D., *Civil Service Commission, Westminster, S.W.*
1887	Bond, Edward, M.P., *Elm Bank, Hampstead, N.W.*
1894	Bonnett, Alfred, 31, *Clifton-road, Peckham, S.E., and* 10, *City-road, E.C.*
1885	Booth, Charles (*Honorary Vice-President*), 2, *Talbot-court, Gracechurch-street, E.C.*
1885	Bordman, Emanuel Linden, *Victoria House, Trinity-street, Southwark, S.E.*
1879	Bordman, Thomas Joseph Clarence Linden, LL.D., *Victoria House, Trinity-street, Southwark, S.E.*
1888	Bottomley, George, *Arbourfield House, Derby.*
1876	Bowen, Horace George, *Bank of England, E.C.*
1894	Bowley, Arthur Lyon, M.A., *St. John's School, Leatherhead.*
1879	Bowley, Edwin, F.I.A., 78, *South Hill Park, Hampstead.*
1886	Boyle, Sir Courtenay, K.C.B., *Board of Trade, Whitehall-gardens, S.W.*
1894	Brabrook, Edward William, C.B., F.S.A., 28, *Abingdon-street, S.W.*
1883	Braby, Frederick, F.C.S., F.G.S., *Bushey Lodge, Teddington.*
1875	Braby, James, J.P., *Maybanks, Rudgwick, Sussex.*
1888	Bramwell, Sir Frederick J., Bart., D.C.L., F.R.S., 5, *Great George-street, Westminster, S.W.*
1873	Brassey, His Excellency The Right Hon. Lord, K.C.B. (*Honorary Vice-President*), *Government House, Melbourne;* 4, *Great George-street, S.W.; and* 24, *Park-lane, W.*
1864	*Braye, The Right Hon. Lord, *Stanford Hall, Rugby.*

Year of Election.	
1883	Brooke, C. B., 16, *Leadenhall-street, E.C.*
1874	Broom, Andrew, A.C.A., "*The Chestnuts*," *Staines, Middlesex.*
1895	Broomhall, George James Short, 84, *Huskisson-street, Liverpool.*
1878	Brown, Alexander Hargreaves, M.P., 12, *Grosvenor-gardens, S.W.*
1896	*Brown, Daniel Maclaren, junr., *P.O. Box*, 187, *Corra Linn, Port Elizabeth, S. Africa.*
1893	Brown, James William Bray, F.S.A.A., *Corporation-st., Birmingham; & Moseley, Worcestershire.*
1890	Browne, Edward William, 33, *Poultry, E.C.*
1875	Browne, Thomas Gillespie C., F.I.A., 11, *Lombard-street, E.C.*
1886	*Brunner, Sir John Tomlinson, Bart., M.P., *Druid's Cross, Wavertree, Liverpool.*
1865	Bunce, John Thackray, *Longworth, Priory-road, Edgbaston, Birmingham.*
1880	*Burdett, Sir Henry Charles, K.C.B., *The Lodge, Porchester-square, W.*
1873	*Burdett-Coutts, The Right Hon. the Baroness, 1, *Stratton-street, W.; and Holly Lodge, Highgate, N.*
1884	Burdett-Coutts, William, M.P., 1, *Stratton-street, Piccadilly, W.*
1897	Burke, David, A.I.A., F.I.Inst., *Royal Victoria Life Ins. Co., Montreal, Canada.*
1895	Burrup, John Arthur Evans, *Statistical Department, Custom House, Calcutta.*
1880	Burt, Frederick, F.R.G.S., *Uplands, Stoke Poges, near Slough, Bucks.*
1872	*Burton, The Right Hon. Lord (*Chesterfield House, Mayfair, W.*); *Rangemore, Burton-on-Trent.*
1886	Bush, Baron William de, F.C.S., 3, *Palace-gate, Kensington, W.*
1893	*Bushill, Thomas William, 2, *Duke-street, Brighton.*
1892	Byworth, Charles Joseph, J.P., F.S.A.A. (*Town Clerk.*) *Town House, Cape Town, South Africa.*
1897	Cairnes, Frederick Evelyn, *Worsley, Manchester.*
1896	Campbell, Charles William, *H.B.M. Consulate General, Shanghai, China.*

Year of Election.	
1877	Campbell, George Lamb, *Market-street, Wigan.*
1879	Campbell-Colquhoun, Rev. John Erskine, *Chartwell, Westerham, Kent.*
1889	Cannan, Edwin, M.A., 24, *St. Giles', Oxford.*
1891	Cannon, Henry W. (*Chase National Bank*), 15, *Nassau-street, New York, U.S.A.*
1881	Carden, Lionel Edward Gresley, *H.M. Consul, Mexico.*
1872	*Carillon, J. Wilson, F.S.A., F.R.G.S., *The Chimes, Richmond, Surrey.*
1893	*Carpenter, Henry Saunders, *Beckington House, Weighton-road, Anerley, S.E.*
1888	Carr, Ebenezer, 24, *Coleman-street, Bank, E.C.*
1893	Carr, William Robert Taylor, *Monument House, Monument-square, E C.*
1888	Carruthers-Wain, William J., *Finsbury Circus Buildings*, 18, *Eldon-street, E.C.*
1890	*Carter, Eric Mackay, A.I.A., F.C.A., 33, *Waterloo-street, Birmingham.*
1883	*Carter, Joseph Robert, 67, *Cromwell-avenue, Highgate, N.*
1878	*Casley, Reginald Kennedy, M.D., *Ipswich.*
1881	Causton, Richard Knight, M.P., 12, *Devonshire-place, Portland-place, W.*
1884	*Chailley-Bert, Joseph, 12, *Avenue Carnot, Paris.*
1880	*Chamberlain, The Right Honourable Joseph, M.P., F.R.S. 40, *Prince's-gardens, S.W.*
1886	Chamberlain, Richard, 39, *Cadogan-square, S.W.*
1886	*Chapman, Samuel, F.I.Inst., *c/o Inter-Oceanic Railway, Apartado* 105, *Mexico City* (*vid New York*).
1892	*Chatham, James, F.I.A., F.F.A., *Inverleith Park House, Edinburgh.*
1851	*Cheshire, Edward, 3, *Vanbrugh Park, Blackheath, S.E.*
1886	*Chisholm, George Goudie, M.A., B.Sc., F.R.G.S., 26, *Dornton-road, Balham, S.W.*
1895	Clarke, Bernard,
1888	Clarke, C. Goddard, J.P., *Fairlawn*, 157, *Peckham Rye, S.E.*
1871	Clarke, Ebenezer, *Fernleigh, Grove-road, Walthamstow.*
1882	*Clarke, Ernest, M.A., F.L.S., F.S.A., 13*a*, *Hanover-square, W.*

Year of Election.

1877 *Clarke, Henry, L.R.C.P.,
H.M. Prison, Wakefield, Yorks.

1890 Clarke. Henry,
Cannon Hall, Hampstead. N.W.

1869 Cleghorn, John,
3, *Spring-gardens, S.W.*

1853 Clirehugh, William Palin, F.I.A.,
66, *Cornhill, E.C.*

1888 Clough, Walter Owen, M.P.,
89, *Gresham-street, E.C; and The Ridgway, Enfield.*

1889 Coate, James,
Lea Coombe House, Axminster.

1873 Cockle, Major George, F.R.G.S.,
9, *Bolton-gardens, South Kensington, S.W.*

1894 Cockram, George Edward,
15, *Addison-road, W.; and Cowleymoor, Tiverton, Devon.*

1884 Cockshott, John James,
24, *Queen's-road, Southport.*

1887 Cohen, Nathaniel Louis, (*Englefield Green, Staines*);
3, *Devonshire-place, Portland-place, W.*

1888 Coleman, Harry,
34, *Golden-square, W.*

1859 Coles, John, F.I.A.,
39, *Throgmorton-street, E.C.*

1892 *Coliet, Miss Clara Elizabeth, M.A.,
36, *Berkeley-road, Crouch End, N.*

1887 Collet, Sir Mark Wilks, Bart.,
2, *Sussex-square, W; and St. Clere, Sevenoaks, Kent.*

1895 Collins, Howard James,
The General Hospital, Birmingham.

1882 *Collum, Rev. Hugh Robert, M.R.I.A., F.R.C.I.,
Leigh, near Tunbridge, Kent.

1867 Colman, Jeremiah James,
Carrow House, Norwich.

1878 Colomb, Captain Sir John C. R., K.C.M.G., M.P.,
Droumquinna, Kenmare, Kerry; & 75, Belgrave-rd., S.W.

1896 Coombes, William Henry,
Royal London Friendly Soc., 108, *Paul-street, Finsbury, E.C.*

1891 Cooper, Joseph,
60, *Park-street, Farnworth, near Bolton.*

1874 Corbett, John,
20, *Hertford-street, Mayfair, W.*

1883 Corgialegno, M.,
George-yard, Lombard-street, E.C.

1873 Cork, Nathaniel, F.R.G.S.,
18, *Birchin-lane, E.C.*

1889 Cornwallis, Fiennes Stanley Wykeham,
Linton-park, Maidstone, Kent.

1895 Costello, James Edward,
3, *Throgmorton-avenue, E.C.*

Year of Election.	
1880	Cotterell-Tupp, Alfred, 17, *Devonshire-terrace, Hyde Park, W.*
1862	Courtney, The Right Hon. Leonard Henry, M.A., M.P. (*President*). 15, *Cheyne Walk, Chelsea, S.W.*
1896	Cox, Harold, 6, *Raymond-buildings, Gray's Inn, W.C.*
1888	Craggs, John George, C.A., *Stone House, St. John's, S.E.*
1874	Craigie, Major Patrick George (*Hon. Secretary and Hon. Foreign Secretary*), 6, *Lyndhurst-rd., Hampstead; & 4, Whitehall-place, S.W.*
1890	Crawford, Richard Frederick, 4, *Whitehall-place, S.W.*
1891	*Crawley, Charles Edward (*Controller General*), *Hyderabad, Deccan, India.*
1894	Crease, Major-General John Frederick, C.B., *United Service Club, Pall-mall, S.W.*
1878	Crewdson, Ernest, *Plait Abbey, Rusholme, Manchester.*
1892	Cripps, Charles Alfred, Q.C., M.P., 32, *Elm Park-gardens, S.W.*
1886	Crispin, Edward, 33, *St. George's-avenue, N.*
1890	Croal, David Octavius, 11, *Abchurch-lane, E.C.*
1883	Cunningham, Rev. William, M.A., D.D., 2, *St. Paul's-road, Cambridge.*
1879	Curtis, Robert Leabon, F.S.I., J.P., 120, *London Wall, E.C.*
1873	Czarnikow, Cæsar, 29, *Mincing-lane, E.C.*
1886	Dale, Sir David, Bart., *West Lodge, Darlington.*
1888	Dangerfield, Athelstan, A.C.A., 17, *Basinghall-street, E.C.*
1880	Danvers, Frederick Charles *India Office, Westminster, S.W.*
1873	Danvers, Sir Juland, K.C.S.I., 103, *Lexham-gardens, Kensington, W.*
1897	*Darwin, Major Leonard, R.E., F.R.G.S., 12, *Egerton-place S.W.*

Electio	
1892	Dash, William Lawson, J.P., 301, *Pitt-street, Sydney, N.S.W.*
1893	Davidson, Captain J. H. D., 31, *Grenfell-street, Adelaide, S. Australia.*
1869	Davies, James Mair, 168, *St. Vincent-street, Glasgow.*
1896	Davies, Theodore Llewelyn, *The Treasury, Whitehall, S.W.*
1874	Davies, William Henry, 51, *Tregunter-road, West Brompton, S.W.*
1893	Davis, Harrison, 75, *Cheapside, E.C.*
1888	Dawson, G. J. Crosbie, M. Inst. C.E., F.G.S. *North Staffordshire Railway, Stoke-upon-Trent.*
1897	Deane, Albert Bickerton, 35, *Great George-street, Westminster, S.W.*
1880	Debenham, Frank, 1, *Fitzjohn's-avenue, Hampstead, N.W.*
1885	De Broë, Emile Conrad De Bichin, 41, *Belsize Avenue, N.W.*
1879	*De Ferrieres, The Baron Du Bois, J.P., *Bay's-hill House, Cheltenham.*
1883	*De Keyser, Sir Polydore (Alderman), 4, *Cornwall Mansions, Cornwall-gardens, S.W.*
1877	Deloitte, William Welch, 4, *Lothbury, E.C.*
1891	Denne, William, *Phillimore, Wetherill-road, New Southgate, N.*
1873	Dent, Edward, 2, *Carlos-place, Grosvenor-square, W.*
1887	Dent, George Middlewood, 13, *Chambres-road, Southport.*
1889	De Rothschild, Leopold, J.P., D.L. (Alderman), 5, *Hamilton-place, Piccadilly, W.*
1892	De Smidt, Henry (*Permanent Under-Secretary*), *Cape Town, Cape Colony.*
1877	Dever, Henry, 4, *Lothbury, E.C.*
1892	Dewar, William Nimmo (*Citizens' Life Assurance Co.*), 21, *Castlereagh-street, Sydney, N.S.W.*
1890	Dickinson, Willoughby Hyett, 19, *Campden-hill-road, W.*
1866	*Dilke, The Right Hon. Sir C. Wentworth, Bart., M.P., LL.M., 76, *Sloane-street, S.W.*
1873	Dixon, George, M.P., *The Dales, Edgbaston, Birmingham.*
1897	Dobson, Goland Burton, 58, *Lincoln's Inn Fields, W.C.*
1889	Double, Alfred, 27, *Jewin-crescent, Cripplegate, E.C.*

Year of Election.	
1889	Doubleday, William Bennett, 123, *Tulse-hill, S.W.*
1889	Douglas, J., *E.I. Railway House, Dalhousie Square, Calcutta.*
1875	Doxsey, Rev. Isaac, 186, *The Grove, Camberwell, S.E.*
1878	Doyle, Patrick, C. E., F.G.S., M.R.A.S., *Calcutta.*
1894	Drage, Geoffrey, M.A., M.P., *Hatfield, Herts.*
1890	Drummond, Charles James, 21, *Dalmore-road, West Dulwich, S.E.*
1897	Dudfield, Reginald, M.A., M.B., 19, *Blomfield-road, Maida Vale, W.*
1895	Dudley, The Right Hon. the Earl of, *Board of Trade, Whitehall Gardens, S.W.*
1875	Dun, John, *Parr's and Alliance Bank, Bartholomew-lane, E.C.*
1886	Dundonald, The Right Hon. the Earl of, 34, *Portman-square, W.*
1878	*Dunraven, The Right Hon. The Earl of, K.P., *Kenry House, Putney Vale, S.W.*
1885	Dyer, William John, 17, *Montpelier-row, Blackheath, S.E.*
1888	Earnshaw, Jacob, 36, *South King-street, Manchester.*
1887	Ebbsmith, Joseph, 86, *St. James's-street, S.W.*
1888	Eckersley, J. C., M.A., F.R.G.S., *Ashfield, Wigan.*
1883	Edgeworth, Professor Francis Ysidro, M.A., D.C.L. (*Vice-President*), 5, *Mount Vernon, Hampstead; and All Souls', Oxford.*
1896	Edwards, Charles Lewis, 748, *Avenida de Mayo, Buenos Aires.*
1880	Egerton of Tatton, The Right Honourable Earl, 7, *St. James's-square, S.W.*

Year of Election.

1885 Elliot, William Henry,
122, *Mansion House-chambers, Queen Victoria-street, E.C.*

1885 Elliott, Thomas Henry, C.B.,
Board of Agriculture, 4, Whitehall Place, S.W.

1885 Elliott, William,
22, *St. George's-street, Cape Town.*

1895 Elliott, William, junr.,
P.O. Box 1,583, *Johannesburg, S. Africa.*

1895 Elwell, William Henry,
38, *Parliament-street, S.W.*

1889 Erhardt, William,
7, *Bury-street, Bloomsbury, W.C.*

1879 Evans, Henry Jones, J.P.,
Greenhill, Whitchurch, Cardiff.

1896 Everett, Percy Wynn,
Elstree, Herts.

1892 Faber, Harald,
Fiona, Lennard-road, Penge, S.E.

1875 Faraday, Frederick J.,
17, *Brazennose-street, Manchester.*

1888 Farlow, A. R. King,
4, *King-street, Cheapside, E.C.*

1889 Farnworth, Edward James,
20, *Cannon-street, Preston.*

1878 Farren George, J.P., M.Inst.C.E.,
Carnarvon.

1878 Farrer, The Right Hon. Lord, (*Honorary Vice-President*),
Abinger Hall, Dorking.

1890 Faulks, Joseph Ernest, B.A., F.I.A.,
187, *Fleet-street, E.C.*

1893 *Fawcett, Mrs. Millicent Garrett,
2, *Gower-street, W.C.*

1882 Fell, Arthur, M.A.,
46, *Queen Victoria-street, E.C.*

1894 Fellows, Rowland Hill, F.I.A.,
20, *Dynham-road, West Hampstead, N.W.*

1893 Fenwick, John Fenwick,
Spencer House, Wimbledon Common.

1894 Field, John William (*Gas Light and Coke Company*),
Horseferry-road, Westminster, S.W.

1880 Finlaison, Alexander John, C.B., F.I.A.,
19, *Old Jewry, E.C.*

Year of Election.	
1889	*Finlay, Major Alexander, *The Manor House, Little Brickhill, Bletchley, Bucks.*
1884	*Finnemore, The Hon. Mr. Justice R. I., F.R.G.S. *Supreme Court, Pietermaritzburg, Natal, South Africa.*
1892	Fisher, George, J.P., M.H.R. (*Chevalier of the Order of Crown of Italy*), *Hill-street, Wellington, N.Z.*
1888	Fisher, Walter Newton, F.C.A., 4, *Waterloo-street, Birmingham.*
1885	*Fitz-Gerald, Lt.-Col. Wm. G., M.A., F.R. Hist. S., F.R.S.L., *Conneragh, Youghal, Ireland.*
1896	Fletcher, Benton, 44, *Bankside, Southwark, S.E.*
1893	*Flux, Alfred William, M.A. (*Owen's College, Manchester*), 10, *Amherst-street, Withington, Manchester.*
1882	Foley, Patrick James, *Pearl Ins. Co., Adelaide-place, London Bridge, E.C.*
1889	Foot, Alfred, *Thurles*, 35, *Thornhill-road, Croydon.*
1841	Fortescue, The Right Honourable Earl, *Castle Hill, South Molton, Devon.*
1893	Fortune, David, J.P., 197, *Pitt-street, Glasgow.*
1884	Fosbery, William Thomas Exham, *The Castle-park, Warwick.*
1897	Fountain, H., 44, *Parliament-street, S.W.*
1868	Fowler, William, 43, *Grosvenor-square, W.*
1890	Fox, Charles Allen, M.R.C.S., M.R.A.S., M.S.A., *Cathays, Cardiff.*
1893	Fox, Stephen Newcome, 12, *Cromwell-crescent, South Kensington, S.W.*
1878	Foxwell, Professor H. Somerton, M.A., *St. John's College, Cambridge.*
1894	Francis, Joseph, 10, *Finsbury-square, E.C.*
1887	Frankland, Frederick William, F.I.A. *New York Life Office*, 346, *Broadway, New York.*
1893	Franklin, Ernest L., 60, *Old Broad-street, E.C.*
1886	Fream, Professor William, B.Sc., Lond., LL.D., F.L.S., F.G.S., *The Vinery, Downton, Salisbury.*
1887	Freeman, T. Kyffin, F.G.S., 35, *Whitehall-park, N.*
1890	Freestone, John, *Sutton-in-Ashfield, Nottingham.*
1896	Fulcomer, Professor Daniel, *State Normal School, Milwaukee, Wis., U.S.A.*

Year of Election.	
1886	Fuller, George Pargiter, *Neston-park, Corsham, Wilts.*
1878	Fuller, William Palmer, *Portland House, Basinghall-street, E.C.*
1879	Gairdner, Charles, *Broom, Newton Mearns, Renfrewshire.*
1852	Galsworthy, Sir Edwin Henry, J.P., 26, *Sussex-place, Regent's-park, N.W.*
1873	*Galton, Capt. Sir Douglas, K.C.B., D.C.L., LL.D., F.R.S., 12, *Chester-street, Grosvenor-place, S.W.*
1860	Galton, Francis, F.R.S., F.R.G.S., 42, *Rutland-gate, S.W.*
1887	Garcke, Emile, *Donington House, Nofolk-street, Strand, W.C.*
1889	Garland, Nicholas Surrey, *Finance Department, Ottawa, Canada.*
1895	Garvan, John Joseph, *Citizen's Life Assurce. Co., Sydney, New South Wales.*
1879	*Gassiot, John Peter, J.P., *The Culvers, Carshalton, Surrey,*
1880	*Gates, John Benjamin, A.C.A., 47, *Warwick-street, Regent-street, W.*
1896	Gerlich, Hermann Gustav, Dr. Jur., 42, *Kensington-mansions, Trebovir-rd., Earl's Court, S.W.*
1885	Gibb, George S., *North-Eastern Railway Company, York.*
1871	Gibbs, George Sleight, 3, *Vane-terrace, Darlington.*
1889	Gibson, George Rutledge, 55, *Broadway, New York City, U.S.A.*
1867	*Giffen, Sir Robert, K.C.B., LL.D., F.R.S. (*Honarary Vice-President*). 9, *Bina-gardens, South Kensington, S.W.*
1877	Gilbert, William H. Sainsbury, 79, *Queen-street, Cheapside, E.C.*
1878	*Glanville, Silvanus Goring, 39, *Vicar's-hill, Lewisham, S.E.*
1860	Glover, John, J.P., 88, *Bishopsgate-street Within, E.C.*
1888	Goad, Charles E., M. Am. Soc. C.E., M. Can. Soc. C.E., 53, *New Broad-street, E.C.; and Montreal, Canada.*

Year of Election.	
1897	Gomme, George Lawrence, F.S.A., 24, *Dorset-square, Marylebone, N.W.*
1884	*Gonner, Professor Edward C.K., M.A., *University College, Liverpool.*
1885	Goodsall, David Henry, F.R.C.S., 17, *Devonshire-place, W.*
1892	Goodwin, Alfred, M.A., 2, *Charles-road, St. Leonards, Sussex.*
1868	Goschen, The Right Hon. George Joachim, M.P. (*Honorary Vice-President*), 69, *Portland-place, W.; and Seacox-heath, Hawkhurst.*
1855	*Gosset, John Jackson, *Thames Ditton, Surrey.*
1885	Goulding, William Purdham, F.S.I., 41, *Moorgate-street, E.C.; and* 18, *Mercers-road, N.*
1887	Gover, Frederic Field, 10, *Lee Park, Blackheath, S.E.*
1893	*Gray, The Hon. James McLaren, M.A., F.R.G.S., 6, *Albemarle-street, Piccadilly, W.*
1895	Green, John Little, *Langholm, Embleton-road, Lewisham, S.E.*
1888	Green, Joseph Shaw, 18, *King Street, Warrington.*
1895	Gretton, John, junr., M.P., *Burton-on-Trent.*
1887	Gribble, George J., *Henlam Grange, Biggleswade.*
1883	Griffin, Josiah, *Vanbrugh Park, Blackheath, S.E.*
1868	Griffith, Edward Clifton, *Reliance Office,* 71, *King William-street, E.C.*
1883	Grimshaw, Thomas Wrigley, C.B., M.D., M.A., (*Registrar-General of Ireland*), *Friorsland, Carrickmines, Co. Dublin.*
1889	Grosvenor, George, *Holywell, Streatham-common, S.W*
1888	Grosvenor, The Hon. Norman de l'Aigle, 30, *Upper Grosvenor-st., W.; Moor-park, Rickmansworth.*
1878	Guthrie, Charles, F.C.A., *London Chartered Bank of Australia, Melbourne, Victoria.*
1885	Guthrie, Edwin, *Victoria Park, Manchester.*
1887	Guyot, Yves (*Deputé*), 95, *Rue de Seine, Paris.*
1880	*Gwynne, James Eglinton A., J.P., F.S.A., 97, *Harley-st., W.; Folkington Manor, Polegate, Sussex.*
1887	Gwyther, John Howard, 34, *Belsize-park-gardens, N.W.*

Year of Election.	
1892	Hadfield, Robert A. *Fairfield, Sheffield.*
1873	*Haggard, Frederick T., 1, *Broadwater Down, Tunbridge Wells.*
1887	Haldeman, Donald Carmichael, 17 *and* 18, *Cornhill, E.C.*
1883	Hall, Sir John, K.C.M.G., *Hororata, Canterbury, New Zealand.*
1897	Hall, Thomas, *Railway Commissioners' Offices, Sydney, N.S W*
1878	Hallett, Thomas George Palmer, M.A., *Claverton Lodge, Bath.*
1887	Hamilton, Sir Edward W., K.C.B.. *The Treasury, Whitehall, S.W.*
1873	Hamilton, The Right Hon. Lord George Francis, 17, *Montagu-street, Portman-square, W.*
1883	Hamilton, James Thomas, 23, *High-street, Southampton.*
1884	*Hammersley, Hugh Greenwood, 14, *Chester-square, S.W.*
1885	*Hancock, Charles, M.A., 2 *Cloisters, Temple, E.C.; and Reform Club, S.W.*
1875	Hankey, Ernest Alers, *Hinxton Hall, Saffron Walden, Essex.*
1876	Hansard, Luke, 68, *Lombard-street, E.C.*
1871	*Harcourt, Right Hon. Sir William Vernon, Q.C., M P., F.R.S., *Reform Club, S.W.*
1886	*Hardcastle, Basil William, 12, *Gainsborough Gardens, Hampstead, N.W.*
1883	Harding, G. P., *La Chaumière, Trouville S./M., France.*
1884	Hardy, George Francis, F.I.A., 12, *Waterloo-place, S.W.*
1893	Harrap, Thomas, 143, *Stamford-street, Ashton-under-Lyne, Lancs.*
1868	Harris, David, *Caroline Park, Granton, Edinburgh.*
1897	Harris, Walter Fred., F.I.C.A., 16, *Parliament-street, Hull.*
1887	Harris, William A., F.I. Inst., F.R.S.S.A., *Phœnix Chambers, Exchange, Liverpool.*
1882	Harris, William James, *Halwill Manor, Beaworthy, N. Devon.*

Year of Election	
1889	Harrold, Major Arthur Lucas, *Adelaide, South Australia.*
1881	Harvey, Alfred Spalding, B.A., 67, *Lombard-street, E.C.*
1884	Harvey, Thomas Morgan, *Portland House, Basinghall-street, E.C.*
1896	Hawkins, Willoughby R., *Bute Docks, Cardiff.*
1897	Hayakawa, S. *Japanese Legation*, 8 *Sussex-square, W.*
1895	Haynes, Thomas Henry, *Ravenswood, West Wickham, Kent.*
1896	Heap, George, *The Charter House, Charterhouse-square, E.C.*
1887	*Heap, Ralph, jun., 1, *Brick-court, Temple, E.C.*
1896	*Heaton-Armstrong, William Charles, J.P., 30, *Portland-place, W.*
1884	Hedley, Robert Wilkin, 31*a*, *Colmore-row, Birmingham.*
1870	Hefford, George V., *Rugby.*
1883	Heilgers, Robert Philip, 24, *St. James's-square, S.W.*
1889	*Hemming, Arthur George, F.I.A., *St. Michael's Cottage, The Common, Weybridge.*
1865	Hendriks, Augustus, F.I.A., 7, *Cornhill, E.C.*
1855	*Hendriks, Frederick, F.I.A., 7, *Vicarage-gate, W.; and* 1, *King William-street, E.C.*
1897	Hepburn, Arnold, 47, *Grosvenor-road, S.W.*
1888	Heriot, George, 1, *Whittington House, Leadenhall-street, E.C.*
1881	Hewat, Archibald, F.I.A., F.F.A., 22, *George-street, Edinburgh.*
1890	Hewins, Professor W. A. S., M.A., 10, *Adelphi-terrace, W.C.*
1895	Hewitt-Fletcher, Stanley, A.C.A., *Administration House, Zomba, British Central Africa.*
1886	Hibbert, H. F., 8, *Park-road, Chorley, Lancashire.*
1892	*Higgs, Henry, LL.B., 12, *Lyndhurst-road, Hampstead, N.W.*
1878	*Hill, Frederick Morley, 22, *Richmond-road, Barnsbury, N.*
1878	Hillingdon, The Right Hon. Lord, *Camelford House, Park-lane, W.*
1890	Hinde, Frederick, *Darley Dale, Kent House-road, Beckenham.*

Year of Election.	
1879	Hoare, H. N. Hamilton, 121, *Sloane-street, S.W.*
1870	*Hoare, Henry, 7, *Sussex-gardens, Hyde-park, W.*
1897	Hodgson, William Gill, A.S.A.A., *Municipal-buildings, West Hartlepool.*
1895	Hoffman, Frederick L., *Prudential Ins. Co. of America, Newark, N.J., U.S.A.*
1889	Hogg, Quintin (Alderman), 5, *Cavendish-square, W.*
1888	Hollams, John, 52, *Eaton-square, S.W*
1895	Holland, Hon. Lionel Raleigh, M.P., 15, *Savile-row, W.*
1894	Hollerith, Herman, Ph.D., &c., 1054, 31*st-street, Washington, D.C., U.S.A.*
1888	Hollington, Alfred J., *Aldgate, E.*
1894	Home, Noel Charles Minchin, LL.B., A.I.A., 14, *Park Parade, Cambridge.*
1891	Hooker, Sir Joseph Dalton, G.C.S.I., F.R.S., &c., *The Camp, Sunningdale.*
1895	*Hooker, Reginald Hawthorn, M.A., 3, *Gray's Inn Place, W.C.*
1896	Hooper, Angus, *Montreal, Canada.*
1879	Hooper, George Norgate, *Elmleigh, Hayne-road, Beckenham, Kent.*
1878	Hooper, Wynnard, 13, *Sumner-place, Onslow-square, S.W.*
1887	Hopkins, John, *Little Boundes, Southborough, Kent*
1896	Hopkinson, Samuel Day, 75, *Old Broad-street, E.C.*
1894	Houldsworth, Sir William H., Bart., M.P., 35, *Grosvenor-place, S.W.*
1883	Howell, Francis Buller, 2, *Middle Temple-lane, E.C.*
1883	Howell, George, *Hampden House, Ellingham-road, Shepherd's Bush, W.*
1897	Howell, Price, *Lindfield, near Sydney, N.S.W.*
1864	Hudson, Thomas, 8, *Helix-gardens, Brixton, S.W.*
1895	Huelin, James Wilson, (*Australian Financial Agency*), *Central-bldgs., William-st., Perth, W. Australia.*
1894	Hughes, Arthur John, C.I.E., M.I.C.E., *Bhagulpur, Bengal, India.*
1874	Humphreys, Noel Algernon (*Honorary Secretary*), *General Register Office, Somerset House, Strand, W.C.*

Year of Election.	
1893	Humphreys-Owen, Arthur Charles, M.P., *Glansevern, Garthmyl, Montgomeryshire.*
1883	Hunt, Richard Aldington, A.I.A., *Moor-street, Birmingham.*
1888	Hunter, George Burton, *Wallsend-on-Tyne.*
1890	Huth, Ferdinand M., 12, *Tokenhouse-yard, E.C.*
1888	Hyde, Clarendon G., 4, *Pump-court, Temple, E.C.*
1887	Hyde, Henry Barry, 5, *Eaton-rise, Ealing, W.*
1893	Hyde, John, 1458, *Euclid-place, Washington, D.C., U.S.A.*
1897	Ingall, Godefroi Drew, F.I.S., *Auckland, New Zealand.*
1874	*Ingall, William Thomas Fitzherbert Mackenzie. *Roborough, Deepdene-road, Streatham, S.W.*
1869	*Inglis, Cornelius, M.D., *Athenæum Club, S.W.*
1888	*Ionides, Alexander A., 1, *Holland Park, W.*
1887	Irvine, Somerset William D'Arcy, J.P., *Equitable Life Office of United States, Brisbane.*
1864	*Ivey, George Pearse, 39, *Denmark-villas, West Brighton.*
1880	*Jackson, The Right Hon. William Lawies, M.P., *Chapelallerton, Leeds.*
1894	Jamieson, George, C.M.G. (*Asst. Judge, Registrar, & Consul*). *H.B.M. Consulate, Shanghai, China.*
1879	Jamieson, George Auldjo, 37, *Drumsheugh-gardens, Edinburgh.*
1872	Janson, Frederick Halsey, F.L.S., 41, *Finsbury-circus, E.C.*

Year of Election.	
1897	Jay, Edward A. Hastings, *Tower House, Woolwich.*
1896	Jenney, Charles Albert, 58, *William-street, New York City, U.S.A.*
1881	*Jersey, The Right Hon. the Earl of, P.C., *Osterley-park, Isleworth.*
1881	Johnson, Edwin Eltham, 110, *Cannon-street, E.C.*
1891	Johnson, George, 10, *The Avenue, Durham.*
1888	Johnson, John Grove, 23, *Cross-street, Finsbury, E.C.*
1880	Johnson, Walter, *Rounton Grange, Northallerton.*
1897	Johnston, James, 129, *High-st., Winchester, & National Liberal Club, S.W.*
1878	Johnstone, Edward, *Nightingale-lane, Clapham-common, S.W.*
1884	*Jones, Edwin, J. P., 141, *Cannon-street, E.C.*
1878	Jones, Henry R. Bence, B.A., *Board of Trade, Whitehall-gardens, S.W.*
1894	Jones, Hugh Richard, M.A., M.D., 58*a*, *Grove-street, Liverpool.*
1888	Jones, J. Mortimer, 12, *Nicholas-lane, E.C.*
1896	Jones, John William, 20, *High-street, Swansea.*
1877	Jones, Theodore Brooke, 70, *Gracechurch-street, E.C.*
1888	*Jordan, William Leighton, 25, *Jermyn-street, S.W.*
1858	Jourdan, Francis, *Normount, Torquay, Devon.*
1890	Joyner, Robert Batson,
1889	Justican, Edwin, F.I.A., *St. Mildred's House, Poultry, E.C.*
1895	Kamensky, Gabriel de, 21, *Blomfield-road, Maida-hill, W.*

Year of Election.	
1895	Karpeles, Benno, LL.D., 34, *Lindenstrasse, Zurich V, Switzerland.*
1873	Kay, Duncan James, *Drumpark, Dumfries, N.B.*
1885	Keen, William Brock, 3, *Church-court, Old Jewry, E.C.*
1884	Kelly, Edward Festus, 182—184, *High Holborn, W.C.*
1883	Keltie, John Scott, F.R.G.S., 27, *Compayne-gardens, West Hampstead.*
1884	Kemp, John, 46, *Cannon-street, E.C.*
1884	*Kennedy, Sir Charles Malcolm, K.C.M.G., C.B., 4, *Louisa-terrace, Exmouth, South Devon.*
1886	Kennedy, John Gordon, *Foreign Office, S.W.*
1878	Kennedy, J. Murray, *New University Club, St. James's-street. S.W.*
1881	*Kennett-Barrington, Sir V. Hunter, M.A., LL.M. 57, *Albert Hall Mansions, S.W.*
1895	Kenyon, James, M.P., *Walshaw Hall, Bury, Lancashire.*
1883	*Keynes, John Neville, M.A., D.Sc. 6, *Harvey-road, Cambridge.*
1884	Kimber, Henry, M.P., 79, *Lombard-street, E.C.*
1852	Kimberley, The Right Honourable the Earl of, M.A., P.C., 35, *Lowndes-square, S.W.*
1883	*King, Bolton, B.A., *Toynbee Hall*, 28, *Commercial-street, E.*
1884	Kirby, Horace Woodburn, F.C.A., 19, *Birchin-lane, E.C.*
1894	Kirkcaldy, William Melville, *Eglinton, Dunedin, Otago, New Zealand.*
1888	*Kitson, Sir James, Bart., M.P., J.P., *Gledhow Hall, Leeds.*
1889	Kloetgen, W. J. H., 34, *Gutter-lane, Cheapside, E.C.*
1878	*Kusaka, Yoshio, *First National Bank, Tokio, Japan.*
1897	Lamperd, Frederick, *Normanville, Constitution-hill, Ipswich.*

Year of Election.

1885 Latham, Baldwin, M. Inst. C.E.,
Duppas House, Old Town, Croydon.

1892 Latham, Stanley A., A.C.A.,
2, *Hare-court, Temple, E.C.*

1874 Lawes, Sir John Bennett, Bart., LL.D., F.R.S., F.C.S.,
Rothamsted-park, St. Albans.

1897 *Lawrence, Frederick William, B.A.,
Trinity College, Cambridge; and 79, Lancaster-gate, W.

1891 Lawrence, James,

1890 Lawson, William Ramage,
Finchley Lodge, North Finchley.

1883 *Leadam, Isaac Saunders, M.A.,
1, *The Cloisters, Temple, E.C.; and Reform Club, S.W.*

1886 Leathes, Stanley M.,
Trinity College, Cambridge.

1879 *Leete, Joseph,
36, *St. Mary-at-hill, E.C.; & Eversden, S. Norwood-park.*

1877 Lefevre, The Right Hon. George Shaw, M.A., J.P.
(*Honorary Vice-President*),
18, *Bryanston-square, W.*

1877 *Leggatt, Daniel, LL.D.,
5, *Raymond-buildings, Gray's-inn, W.C.*

1887 Leitch, Alexander,
17, *King William-street, E.C.*

1895 Leman, Ernest Montague,
31, *Cannon-street, E.C.*

1892 Leon, Herbert Samuel,
Bletchley Park, Bletchley, Bucks.

1888 *Le Poer-Trench, Col. The Hon. W., R.E., J.P.,
3, *Hyde Park-gardens, W.*

1887 *Le Roy-Lewis, Herman, B.A.,
Westbury House, Petersfield, Hants.

1862 Lewis, Robert,
1, *Bartholomew-lane, E.C.*

1888 *Liberty, A. Lasenby,
The Manor House, The Lee, near Gt. Missenden, Bucks.

1877 Ligertwood, Thomas, M.D., F.R.C.S.,
Royal Hospital, Chelsea, S.W.

1884 *Lines, William Edward,
c/o R. S. Lines, Noel House, Hertford.

1892 Llewelyn, Sir John T. D., Bart., M.P.,
Penllergare, Swansea.

1879 Lloyd, Wilson, F.R.G.S.,
Myvod House, Wood-green, Wednesbury.

1888 Loch, Charles S., B.A. (*Vice-President*),
Hedge Row Cottage, Queen Anne's-gardens, Bedford-park.

1882 *Longstaff, George Blundell, M.A., M.D., F.R.C.P.
(*Vice-President*),
Highlands, Putney Heath, S.W.

Year of Election.	
1876	*Lornie, John Guthrie, J.P. (*of Birnam and Pitcastle*), *Rosemount, Kirkcaldy, N.B.*
1892	Lough, Thomas, M.P., 29, *Hyde Park-gate, S.W.*
1886	*Low, Malcolm, 22, *Roland-gardens, S.W.*
1895	Lowe, Thomas Enoch, F.S.A.A., 89, *Darlington-street, Wolverhampton.*
1889	Lowles, John, M.P., *Hill-crest, Darenth-road, Stamford-hill, N.*
1865	Lubbock, The Right Hon. Sir John, Bart., M.P. F.R.S. (*Trustee*), *High Elms, Farnborough, Kent.*
1878	Lucas, Sir Thomas, Bart., J.P., 37, *Great George-street, Westminster, S.W.*
1875	*Mabson, Richard Rous, 51, *Cannon-street, E.C.*
1873	*Macandrew, William, J.P., *Westwood House, near Colchester.*
1894	Macaulay, Thomas Bassett, *Sun Life Assurance Co. of Canada, Montreal, Canada.*
1891	MacBrayne, John Burns, 17, *Royal Exchange-square, Glasgow.*
1884	McCabe, William, LL.B., F.I.A., *Drawer* 2,591, *Toronto, Canada.*
1888	McCankie, James, 63, *George-street, Edinburgh.*
1867	M'Clean, Frank, *Rusthall House, Tunbridge Wells.*
1892	McCleery, James C., *Old Bank Chambers*, 8, *Park Row, Leeds.*
1897	MacDonald, Mrs. Margaret Ethel, 3, *Lincoln's Inn Fields, W.C.*
1872	Macdonell, John, LL.D., *Room* 183, *The Royal Courts of Justice, Strand, W.C.*
1873	*McEwen, Laurence T., *c/o. R. A. McLean*, 1, *Queen Victoria-street, E.C.*
1886	*Mackenzie, Colin, F.R.G.S.,
1878	McKewan, William, *Elmfield, Bickley, Kent.*

Year of Election.

1876 *McLean, Robert Allan, F.R.G.S.,
1, *Queen Victoria-street, E.C.*

1863 *Maclure, John William, M.P., J.P., D.L.,
Carlton Club; The Home, Whalley Range, Manchester.

1888 McNiel, Henry,
29, *Cornhill, London, E.C.*

1875 Macpherson, Hugh Martin, F.R.C.S. (*Inspector-General*),
6, *Arlington-street, S.W.*

1887 Macpherson, Walter Charles Gordon,
31, *Kensington-gardens-square, W.*

1882 MacRosty, Alexander,
West Bank, Esher.

1889 McVail, John C., M.D., &c.,
2, *Strathallan-terrace, Dowanhill, Glasgow.*

1891 Maidment, Thomas,
1, *Worsley-road, Southsea.*

1887 Malleson, Frank R.,
Dixton Manor House, Winchcombe, Cheltenham.

1884 *Manson, Frederick William,
Wellfield, Muswell Hill, N.

1888 Manuel, James,
c/o The London and Provincial Bank, Cardiff.

1877 *Maple, Sir John Blundell, Bart., M.P.,
8, *Clarence-terrace, Regent's-park, N.W.*

1880 *Marshall, Professor Alfred, M.A.,
Balliol Croft, Madingley-road, Cambridge.

1894 Marshall, David,
P.O. Box 45, *Durban, Natal.*

1887 Marshall, W. Bayley, M.Inst.C.E., M.Inst.M.E.,
Struan, Richmond Hill, Edgbaston, Birmingham.

1887 Martin, James,
4, *King-street, Cheapside, E.C.*

1872 *Martin, Richard Biddulph, M.A., M.P. (*Treasurer*),
10, *Hill-street, Berkeley-square, W.*

1884 Mason, William Arthur,
31*a*, *Colmore-row, Birmingham.*

1875 *Mathers, John Shackleton,
Hanover House, Leeds, Yorkshire.

1883 Mathieson, Frederic Coxhead,
Beechworth, Hampstead, N.W.

1882 Medhurst, John Thomas, F.S.A.A.,
City of London College, White-street, Moorfields, E.C.

1883 *Medley, George Webb,
21, *Park-street, Park-lane, W.*

1853 *Meikle, James, F.I.A.,
6, *St. Andrew's-square, Edinburgh.*

1884 Merton, Zachary,
18, *Chesham-place, S.W.*

1890 Miller, Gordon William,

Year of Election.	
1879	Miller, William, 67, *Queen Victoria-street, E.C.*
1889	Mills, Major Henry Farnsby,
1897	Milne, C. Williamson, 51, *Linden-gardens, Notting-hill, W.*
1892	Milner, His Excellency Sir Alfred, G.C.M.G., K.C.B., M.A., *Government House, Cape Town.*
1882	Milnes, Alfred, M.A., 44, *Goldhurst-terrace, S. Hampstead, N.W.*
1895	Milton, Viscount, M.P., 46, *Eaton-square, W.*
1874	*Mocatta, Frederick D., F.R.G.S., 9, *Connaught-place, W.*
1878	Moffat, Robert J., *Bank House, Cambridge.*
1888	*Molloy, William R. J., M.R.I.A. (*National Education Board*), 17, *Brookfield-terrace, Donnybrook, Dublin.*
1887	Moore, Arthur Chisholm, 23, *Essex-street, Strand, W.C.*
1874	Moore, Charles Rendall, 137, *Brockley-road, Lewisham-road, S.E.*
1878	*Moore, John Byers Gunning, *Loymount, Cookstown, Ireland.*
1893	Morgan, Percy Charlton, 5, *Victoria-street, S.W.*
1874	*Morris, James, M.D., F.R.C.S., 13, *Somers-place, Hyde-park-square, W.*
1888	Morris, John, (17, *Throgmorton-avenue, E.C.*), 34, *Hyde-park-square, W.*
1891	Morrison, Rev. William Douglas, 2, *Embankment-gardens, Chelsea, S.W.*
1885	*Mosley, Tonman, *Bangors, Iver, Uxbridge.*
1886	Mowbray, Robert Gray Cornish, 10, *Little Stanhope-street, S.W.*
1886	Moxon, Thomas B., *Manchester and County Bank Limited, Manchester.*
1889	Muir, Robert, jun., *Clydesdale, Wolseley-road, Crouch-end, N.*
1883	Muirhead, Henry James, *Fairfield, Hythe, Kent, and Reform Club, S.W.*
1880	Mulhall, Michael George, *Killiney Peak, Dublin.*
1897	Mullins, George Lane, M.A., M.D., 293, *Elizabeth-street, Hyde-park, Sydney, N.S.W.*
1890	Mumby, Bonner Harris, M.D.,

Year of Election.	
1891	Murphy, Shirley Foster, M.R.C.S., 22, *Endsleigh-street, Tavistock-square, W.C.*
1878	Murray, Adam, *Hazeldean, Kersal, Manchester.*
1892	Naoroji, Dadabhai, *Washington House*, 72, *Anerley-park, S.E.*
1888	Narraway, W. F., *Crooms Hill House, Greenwich, S.E*
1889	Nash, William, M.D., M.R.C.S. (*Surgeon-Major-General*), *Royal Victoria Hospital, Netley, nr. Southampton.*
1878	*Nathan, Henry,
1869	Neison, Francis Gustavus Paulus, F.I.A., 93, *Adelaide-road, South Hampstead.*
1895	Nesbitt, Thomas Huggins (*Town Clerk*), *Douglas, Isle of Man.*
1897	Neumann, Joseph Oscar, 139, *Salisbury-court, Fleet-street, E.C.*
1877	Nevill, Charles Henry, 11, *Queen Victoria-street, E.C.*
1894	Newey, William Lewis, F.S.A.A., 39, *Temple-row, Birmingham.*
1889	Newsholme, Arthur, M.D., 11, *Gloucester-place, Brighton.*
1895	*Nicholson, Charles Norris, 35, *Harrington-gardens, South Kensington, S.W.*
1878	Nicholson, Professor J. Shield, M.A., D.Sc., *University of Edinburgh.*
1858	Nightingale, Miss Florence, 10, *South-street, Park-lane, W.*
1871	*Noble, Benjamin, F.R.A.S., *Westmorland House, Low Fell, Gateshead.*
1877	Norman, General Sir Henry Wylie, K.C.B., G.C.M.G., 85, *Onslow-gardens, S.W.* (*Agent-General for Queensland*).
1889	Northampton, The Most Hon. the Marquess of 44, *Lennox-gardens, S.W.*

Year of Election.

1878 Northbrook, The Right Hon. the Earl of, G.C.S.I., D.C.L., 4, *Hamilton-place, Piccadilly, W.*

1878 Notthafft, Theodor, *St. Petersburg Int. Commercial Bank, St. Petersburg.*

1888 Oakley, Sir Henry (*General Manager, G.N.R.*), 37, *Chester-terrace, Regent's-park, N.W.*

1893 O'Connor, Vincent C. Scott (*Authors' Club*, 3, *Whitehall-court*), *c/o W. Watson & Co.*, 7, *Waterloo-place, S.W.*

1880 *Oelsner, Isidor,

1885 Ogle, William, M.A., M.D., F.R.C.P., &c., 10, *Gordon-street, Gordon-square, W.C.*

1885 *Oldham, John, *River Plate Telegraph Company, Montevideo.*

1884 Oldroyd, Mark, M.P., *Hyrstlands, Dewsbury, Yorkshire.*

1896 Olney, George Washington, LL.B., 58, *William-street, New York City, U.S.A.*

1892 Onslow, The Right Hon. The Earl of, G.C.M.G., *Clandon-park, Guildford, Surrey.*

1878 Oppenheim, Henry, 16, *Bruton-street, Bond-street, W.*

1877 Ormond, Richard, 24, *Grainger-street West, Newcastle-on-Tyne.*

1889 Oung, Moung Hla (*Assistant Comptroller*), *Rangoon, Burma.*

1894 Owen, Edgar Theodore, *Registrar of Friendly Societies, Perth, W. Australia.*

1887 Owen, Evan F., A.I.A., *Actuary for Friendly Societies, Melbourne, Victoria.*

1887 *Page, Edward D., (*Box* 3382,) *c/o Faulkner, Page, & Co., New York City, U.S.A.*

1886 Pain, James, *St. Mary's-street, Ely.*

Year of Election.

1866 *Palgrave, Robert Harry Inglis, F.R.S.,
Belton, Great Yarmouth, Norfolk.

1888 Pannell, William Henry,
Library-chambers, Basinghall-street, E.C.

1878 Park, David Francis, C.A., F.F.A., A.I.A.,
39, *Lombard-street, E.C.*

1887 Parker, Archibald,
Camden-wood, Chislehurst, Kent.

1878 Parry, Thomas,
Grafton-place, Ashton-under-Lyne.

1883 Paterson, John,
1, *Walbrook, E.C.*

1888 Pattullo, James Durie,
71, *King William-street, E.C.*

1877 Paul, Henry Moncreiff,
12, *Lansdowne-crescent, Notting-hill, W.*

1878 Paulin, David,
6, *Forres-street, Edinburgh.*

1893 Payne, Alexander William, F.C.A.,
70, *Finsbury-pavement, E.C.*

1884 *Peace, Sir Walter, K.C.M.G.,
64, *Victoria-street, Westminster, S.W.*

1880 *Pease, Sir Joseph Whitwell, Bart., M.P.,
Hutton Hall, Gisborough, Yorks.

1876 *Peek, Sir Henry William, Bart.,
Rousdon, Devon.

1895 Peixotto, M. Percy (*U.S. Equitable Life Office*).
24, *Rue de la République, Lyons, France.*

1891 Penn-Lewis, William,
48, *Springfield-road, Leicester.*

1894 Perris, George Herbert,
33, *Burnaby-gardens, Chiswick, W.*

1890 Peters, John Wyatt,
The Gables, Grove-road S., Southsea.

1883 Petheram, Frederick William, F.C.A.,
61, *Gracechurch-street, E.C.*

1886 Peto, Sir Henry, Bart., M.A.,
Chedington Court, Misterton, Crewkerne, Somersetshire.

1887 Phelps, Lieut.-General Arthur,
23, *Augustus-road, Edgbaston, Birmingham.*

1886 *Phelps, The Rev. Lancelot Ridley, M.A.,
Oriel College, Oxford.

1895 Phillips, Robert Edward (A.M.Inst.C.E.),
70, *Chancery-lane, E.C.*

1871 *Pickering, John, F.R.G.S., F.S.A.,
86, *Thicket-road, Anerley, S.E.*

1878 *Pim, Joseph Todhunter,
Rinnamara, Monkstown, County Dublin.

1886 Pink, J. Francis,
62, *Chandos-street, Strand, W.C.*

Year of Election.	
1877	Pirbright, The Right Hon. Lord, *Carlton Club, Pall Mall, S.W.*
1890	Pittar, Thomas J., *H.M. Custom House, E.C.*
1881	Planck, Charles, M.R.C.S. (*Deputy Surgeon-General*),
1883	Platt, James, *Rookwood, Hampstead. N.W.*
1895	Platt-Higgins, Frederick, M.P., *Homeleigh, Bowdon, Cheshire.*
1861	Plowden, Sir Wm. Chicele, K.C.S.I. (5, *Park-cres., Portland-place, W.*); *Aston Rowant House, Tetsworth, Oxon.*
1888	Pollard, James, J.P. *Chamber of Commerce, Edinburgh.*
1884	Polson, John, *West Mount, Paisley, N.B.*
1896	*Pontifex, Bryan, 116, *St. Paul's-road, Highbury, N.*
1891	Pope, Henry Richard, *Iddesleigh Mansions, Westminster, S.W.*
1891	Potter, Henry, 222, *Queen's-road, New Cross Gate, S.E.*
1879	*Powell, Sir Francis Sharp, Bart., M.P. (*Horton Old Hall, Bradford*); 1, *Cambridge-square, Hyde-park, W.*
1888	Powell, James Heslop, 17, *Gracechurch-street, E.C.*
1895	Powell, Thomas Edmund, *Oakridge, Dorking.*
1871	Power, Edward, 16, *Southwell-gardens, South Kensington, S.W.*
1877	*Prance, Reginald Heber, *Frognal, Hampstead, N.W.*
1877	Praschkauer, Maximilian, 109, *Fenchurch-street, E.C.*
1867	*Pratt, Robert Lindsay, 80, *Bondgate, Darlington.*
1896	Pretyman, Captain Ernest George, M.P., *Orwell-park, Ipswich.*
1887	*Price, L. L., M.A., *Oriel College, Oxford.*
1877	Price-Williams, Richard, M.Inst.C.E., 32, *Victoria-street, S.W.*
1887	Probyn, Lesley Charles, 79, *Onslow-square, S.W.*
1889	Probyn, Major Clifford, 55, *Grosvenor-street, Grosvenor-square, W.*
1884	*Proctor, William, *Bankfield, Upper Chorlton-road, Manchester.*
1886	Provand, Andrew Dryburgh, M.P., 2, *Whitehall-court, S.W.*

Year of Election.

1896 Pryor, Edward Thomas,
23, *Fore-street, E.C.*

1871 Puleston, Sir John Henry,
2, *Bank-buildings, Princes-street, E.C.*

1886 Pulley, Sir Joseph, Bart.,
90, *Piccadilly, W.*

1874 Quain, Sir Richard, Bart., M.D., F.R.S., F.R.C.P.,
67, *Harley-street, W.*

1883 Rabbidge, Richard, F.C.A.,
32, *Poultry, E.C.*

1872 *Rabino, Joseph,
(*Chief Manager*), *Imperial Bank of Persia, Teheran.*

1888 *Radcliffe, Sir David, J.P.,
Rosebank, Knowsley, Prescot.

1858 *Radstock, The Right Honourable Lord,
Mayfield, Woolston, Southampton.

1888 Rae, George,
Redcourt, Birkenhead.

1885 Rae, John, M.A.,
37, *Werter-road, Putney, S.W.*

1887 Raffalovich, His Excellency Arthur,
19, *Avenue Hoche, Paris.*

1897 Rai Bihari Lal, F.R.S.L.,
Saugor, Central Provs., India.
c/o W. Watson & Co., 7, Waterloo-place, S.W.

1877 Raikes, Lieut.-Col. George Alfred, F.S.A., F.R. Hist Soc.,
13, *Carlton-road, Ealing, W.*

1860 Ramsay, Alexander Gillespie, F.I.A.
Canada Life Assurance Co., Hamilton, Canada West.

1885 Randell, James S.,
19, *Alfred-street, Bath.*

1880 Rankin, James, M.P.,
35, *Ennismore-gardens, Prince's-gate, S W.*

Year of Election.	
1897	Ranson, Albert, 32, *Westgate-street, Ipswich.*
1884	Raphael, Alfred, 87, *Alexandra-road, N.W.*
1878	Rathbone, William, *Greenbank, Liverpool, E.*
1884	*Ravenscroft, Francis, *Birkbeck Bank, Chancery-lane, W.C.*
1874	*Ravenstein, Ernest George, F.R.G.S., 2, *York-mansions, Battersea-park, S.W.*
1886	Rawlins, Frederick, *Southport, Queensland.*
1877	*Rawlins, Thomas, 45, *King William-street, E.C.*
1895	Rawlinson, Albert, 3/5, *Garstin's Place, Calcutta.*
1895	Rawson, Cecil Frank, B.A., *Bury St. Edmunds.*
1835	Rawson, Sir Rawson W., K.C.M.G., C.B. (*Honorary Vice-President*), 68, *Cornwall-gardens, Queen's-gate, S.W.*
1893	Rea, Charles Herbert Edmund, 223, *Norwood-road, Herne Hill, S.E.*
1889	*Reed, Thomas, F.C.A., 63, *King-street, South Shields.*
1888	Reid, Herbert Lloyd, *Ardentinney, Balham Park-road, Balham, S.W.*
1888	Rew, Robert Henry, 8, *Wharton-road, West Kensington, W.*
1886	Rhens, Robert, 20, *Fussett-square, Dalston, N.E.*
1888	Rhodes, George Webber, 131, *Wool Exchange, E.C.*
1895	Richards, Roger C. (*Inner Temple*), *Crayford House, Honor Oak-road, S.E.*
1896	Richards, Samuel Norman, 583, *Seven Sisters-road, Tottenham.*
1888	Richardson, J. H., 8, *Finch-lane, Cornhill, E.C.*
1895	Richardson, Thomas, M.P., *Kirklevington Grange, Yarm, Yorks.*
1873	Ripon, The Most Hon. the Marquess of, K.G., F.R.S., &c., 9, *Chelsea Embankment, S.W.*
1892	Rivington, Francis Hansard, 44, *Connaught-square, W.*
1882	Roberts, Edward, F.R.A.S. (*Nautical Almanac Office*), 3, *Verulam-buildings, Gray's Inn, W.C.*
1890	Roberts, Sir William, M.D., F.R.S., 8, *Manchester-square, W.*

Year of Election.	
1894	Robertson, James Barr, 3, *Whitehall-court, S.W.*
1885	Robertson, Thomas Stewart (*Nat. Mutual Life Assoc. of Aust.*), *Corner of Collins and Queen-streets, Melbourne.*
1887	Robinson, Henry James, *St. John's Villa, Woodlands, Isleworth, W.*
1886	Roechling, Herman Alfred, A.M. Inst. C.E., 14, *Market-street, Leicester.*
1880	*Ronald, Byron L., 14, *Upper Phillimore-gardens, W.*
1873	*Rosebery, The Right Hon. the Earl of, LL.D., F.R.S., 38, *Berkeley-square, W.*
1892	Ross, Charles Edmonstone, F.S.A.A., *Examiner of Accts., Guaranteed Rlwys., Bombay.*
1893	Rothwell, Richard Pennefather (*Editor, Engineering and Mining Journal*), 253, *Broadway, Room* 817, *New York, U.S.A.*
1897	Rothwell, William Thomas, J.P., *Newton Heath, nr. Manchester.*
1890	Ruffer, Marc Armand, M.A., M.D., B.Sc., *Medical School, Cairo, Egypt.*
1888	Rusher, Edward Arthur, F.I.A., 142, *Holborn Bars, E.C.*
1886	Russell, Arthur B., A.C.A., 11, *Ludgate hill, E.C.;* 16, *Dartmouth-park-road, N.W.*
1878	Russell, Richard F., 8, *John-street, Adelphi, W.C.*
1873	Rutherford-Elliot, J. G., *Elphinstone, Tyndall's Park-road, Clifton, Bristol.*
1894	Sachs, Edwin Otho, 11, *Waterloo-place, Pall Mall, S.W.*
1873	*Salisbury, The Most Hon. the Marquess of, K.G., P.C., F.R.S. 20, *Arlington-street, W.*
1875	*Salomons, Sir David Lionel, Bart., J.P., *Broom-hill, Tunbridge Wells.*
1876	Salt, Thomas, *Weeping Cross, Stafford.*
1892	Samuel, Charles, 176, *Sutherland-avenue, Harrow-road, W.*
1868	Samuelson, Sir Bernhard, Bart., F.R.S., 56, *Prince's-gate, Hyde-park, S.W.*

Year of Election.	
1895	Sanger, Charles Percy, B.A., 3, *Hare-court, Inner Temple, E.C.*
1891	Sarda, Pandit Har Bilas, B.A., M.R.A.S., *Government College, Ajmere, India.*
1895	Satthianadhan, Professor S., M.A., *Presidency College, Madras, India.*
1886	Sauerbeck, Augustus, 4, *Moorgate-street-buildings, E.C.*
1893	Saunders, Cecil Roy, F.I. Inst., *Downs House, Eling, Hants.*
1877	Saunders, Charles Edward, M.D., *County Asylum, Hayward's Heath, Sussex.*
1852	Saunders, James Ebenezer, F.G.S., J.P., 9, *Finsbury-circus, E.C.*
1888	Sawyer, Lucian Willard, *Billiter-square Buildings, E.C.*
1887	*Scarth, Leveson, M.A., *Elms-lea, Cleveland-walk, Bath.*
1883	Schidrowitz, Samuel, 102, *Oxford-gardens, Notting-hill, W.*
1877	Schiff, Charles, 22, *Lowndes-square, S.W.*
1891	*Schloss, David F., M.A., *Hill House, Wimbledon.*
1895	Schmidt, Hermann, *Lombard House, George-yard, Lombard-street, E.C.*
1891	Schooling, John Holt, *Fotheringay House, Montpelier-row, Twickenham.*
1895	Schuurman, Willem H. A. Elink, *Oudegracht Tz.* 146, *Utrecht.*
1883	*Schwann, John Frederick, *Oakfield, Wimbledon, S.W.; and* 6, *Moorgate-street, E.C.*
1888	Scotter, Sir Charles (*General Manager, L. & S.W.R.*), *Waterloo Station, Waterloo-road, S.E.*
1887	Seaton, Edward, M.D., Lond., F.R.C.P., *The Limes, Clapham-common, S.W.*
1880	*Seeley, Sir Charles, Bart., M.P., *Sherwood Lodge, Nottingham.*
1886	Seyd, Ernest J. F., 38, *Lombard-street, E.C.*
1873	Seyd, Richard, 38, *Lombard-street, E.C.*
1888	Shaw, James Charles, *Dene Court, Bishop's Lydeard, Somerset.*
1894	Shaw, William Arthur, M.A., *Sandown House, Byfleet-road, Weybridge.*
1896	Sheppard, William Fleetwood, M.A., LL.M., 2, *Temple-gardens, E.C.*
1885	Sherwin, Joseph Henry, 16, *Whitehall-place, S.W.*

Year of Election.	
1888	Shillcock, Joshua, M.A., *Bank of England, West Branch, Burlington-gardens, W.*
1871	Sidgwick, Professor Henry, M.A., *Trinity College, Cambridge.*
1886	Silver, Stephen William, 3, *York-gate, Regent's-park, N.W.*
1878	Simmonds, G. Harvey, 1, *Whitehall, S.W.*
1892	*Sinclair, Captain John, 101, *Mount-street, Berkeley-square, W.*
1850	Singer, Charles Douglas, *Silverton, Silver-street, Enfield Town.*
1881	Skrine, Francis Henry B., J.P., *c/o H. S. King and Co.*, 45, *Pall Mall, S.W.*
1888	Slade, Alfred Thomas, *Wardrobe-chambers, Queen Victoria-street, E.C.*
1888	Slade, Francis William, 17, *Victoria-street, Westminster, S.W.*
1883	Sly, Richard Stevens, J.P., F.R.G.S., *Fern Villa, Queen's-road, New Cross Gate, S.E.*
1869	Smee, Alfred Hutcheson, M.R.C.S., *The Grange, Wallington, Surrey.*
1878	*Smith, Charles, M.R.I.A., F.G.S., Assoc. Inst. C.E., *c/o Sir Henry Gilbert, F.R.S., Harpenden, St. Albans.*
1896	Smith, Edward, 75, *Gore-road, South Hackney, N.E.*
1871	Smith, E. Cozens, 1, *Old Broad-street, E.C.*
1878	*Smith, George, LL.D., C.I.E., *Serampore House, Napier-road, Edinburgh.*
1889	Smith, George Armitage, M.A., 26, *Regent's Park-road, N.W.*
1888	Smith, H. Llewellyn, M.A., B.Sc. 49, *Beaumont-square, E.*
1877	Smith, Howard S., A.I.A., F.F.A. 37, *Bennett's Hill, Birmingham.*
1891	Smith, James Parker, M.P., *Jordanhill, Partick, N.B.*
1877	Smith, John, 8, *Old Jewry, E.C.*
1883	Smith, Samuel, M.P., 11, *Delahay-street, Westminster; and Reform Club, S.W.*
1888	Smith, Walter J., *St. Bartholomew's Chambers*, 61, *West Smithfield, E.C.*
1890	Smith, William Alexander, J.P., *Arpafeelie, Moorebank, N.S.W.*
1894	*Smith, The Hon. William Frederick Danvers, M.P., 3, *Grosvenor-place, S.W.*
1894	Smithers, Frederick Oldershaw, 171, *Adelaide-road, Hampstead, N.W.*

Year of Election.	
1887	Snell, Arthur Henry, 27, *Mincing-lane, E.C.*
1897	Southgate, Henry William, 28, *Springfield-place, Leeds.*
1895	Soward, Alfred Walter, 28, *Therapia-road, Honor Oak, S.E.*
1855	Sowray, John Russell, 2, *Princes-mansions, Victoria-street, S.W.*
1896	Sparrow, Frederick Syer, *Hollingwood, Goulton-road, Lower Clapton, N.E.*
1889	Speirs, Edwin Robert, 5, *Harrington-gardens, Queen's Gate, S.W.*
1867	*Spencer, Robert James, 175, *King's-road, Southsea.*
1892	Spender, John Alfred, M.A., 29, *Cheyne-walk, S.W.*
1897	Spensley, J. Calvert (*Stat. Dept., London County Council*), *Leighton Hall, Leighton-crescent, N.W.*
1883	Spicer, Albert, 50, *Upper Thames-street, E.C.*
1856	*Sprague, Thomas Bond, M.A., LL.D., F.I.A., 26, *St. Andrew-square, Edinburgh.*
1882	Stack, Thomas Neville (9, *Crosby-square, E.C.*), 70, *Gloucester-crescent, Regent's-park, N.W.*
1889	Stanton, Arthur G., 13, *Rood-lane, E.C.; & Oakfield, Eliot-pk., Blackheath, S.E.*
1877	Staples, Sir Nathaniel Alexander, Bart., *Lissan, Cookstown, Tyrone, Ireland.*
1880	Stark, James, 17, *King's Arms-yard, E.C.*
1880	Stephens, William Davies, J.P. (Alderman), 22, *Percy-gardens, Tynemouth.*
1882	*Stern, Edward D., 4, *Carlton-house-terrace, S.W.*
1885	Stevens, Marshall, *Bolton Lodge, near Eccles.*
1877	Stone, William Alfred, 90, *Cannon-street, E.C.; Hayton, Bramley Hill, Croydon.*
1889	Stow, Harry Vane, *National Liberal Club, Whitehall-place, S.W.*
1872	Strachey, General Sir Richard, R.E., G.C.S.I., F.R.S., 69, *Lancaster-gate. W.*
1893	Strahan, Samuel Alexander Kenny, M.D., *Berry Wood, Northampton.*
1883	*Strathcona & Mount Royal, The Right Hon. Lord, G.C.M.G., 17, *Victoria-street, S.W.* (*High Commissioner for Canada*).
1880	Strutt, Hon. Frederick, *Milford House, near Derby.*
1891	Stuart, Harold A., *With the Governor of Madras, India.*

Year of Election.

1884 *Sugden, Richard,
The Farre Close, Brighouse, Yorkshire.

1895 Sutherland, J. Francis, M.D.,
23, *Rutland-square, Edinburgh.*

1881 Sykes, George Samuel,
1, *Grant's-lane, Calcutta, India.*

1894 Tagliaferro, Napoleone, F.R.H.S.,
Education Office, Malta.

1859 *Tait, Patrick Macnaghten, F.R.G.S.,
86, *Oakley-street, S.W.*

1889 Tarling, Charles,

1889 Tattersall, William,
Hazelwood, Hale, Cheshire.

1889 Tayler, Stephen Seaward (Alderman),
151, *Brixton-road, S.W.*

1887 Taylor, R. Whately Cooke,
Regent Chambers, 121, *West Regent-street, Glasgow.*

1888 *Taylor, Theodore Cooke, J.P.,
Sunny Bank, Batley, Yorkshire.

1893 Teece, Richard, F.I.A., F.F.A.,
87, *Pitt-street, Sydney, N. S. Wales.*

1884 Tempany, Thomas William, F.R.H.S.,
25, *Bedford-row, W.C.*

1888 Temperley, William Angus, jun.,
2, *St. Nicholas-buildings, Newcastle-on-Tyne.*

1888 Theobald, John Wilson,
85, *Palmerston-buildings, E.C.*

1889 Thodey, William Henry,
479, *Collins-street, Melbourne, Victoria.*

1888 Thomas, David Alfred, M.P.,
Llanwern, near Newport, Mon.

1887 Thomas, John,
18, *Wood-street, E.C.*

1896 Thomas, John Tubb, L.R.C.P., L.R.C.S., Edin., D.P.H., &c.,
Medical Officer of Health, Alliance Chambers, Leicester.

1879 Thomas, W. Cave,
47, *Russell-road, W.*

1864 *Thompson, Henry Yates,
26*a*, *Bryanston-square, W.*

Year of Election.

1896 Thomson, Alexander Gibbon,
18, *Fountainhill-road, Grange, Edinburgh.*

1895 Thomson, David Couper, J.P.,
Dundee Courier Office, Dundee.

1882 Tinker, James,
Hordlecliff, Lymington, Hants.

1889 Touch, George Alexander,
Eaton Tower, Caterham Valley, Surrey.

1868 *Treatt, Frank Burford, J.P.,
Fernmount, Bellenger River, New South Wales.

1868 Tritton, Joseph Herbert,
54, *Lombard-street, E.C.*

1892 Trobridge, Arthur,
Bloxcidge House, Langley Green, near Birmingham.

1890 *Turner, Rev. Harward, M.D., Paris, B.Sc., F.R.M.S.,

1885 Turner, William,
c/o The Librarian, Free Public Library, Trinity-st., Cardiff.

1892 Tyler, Edgar Alfred,
1, *Queen Victoria-street, E.C.*

1841 Tyndall, William Henry, F.I.A.,
Morlands, Oxford-road, Redhill.

1893 Tyrer, Thomas, F.I.C., F.C.S.,
Stirling Chemical Works, Stratford, E.

1877 *Urhn, Richard Denny,
22, *Stafford-terrace, Phillimore-gardens, W.*

1888 Van Raalte, Marcus,
22, *Austin Friars, E.C.*

1890 Venn, John, D.Sc., F.R.S.,
Caius College, Cambridge.

1889 Venning, Charles Harrison,
33, *Old Broad-street, E.C.*

Year of Election	
1888	Verdin, William Henry, J.P., *Winsford, Cheshire.*
1897	Verney, Sir Edmund Hope, Bart., F.R.G.S., F.R.M.S., *Claydon House, Winslow, Bucks.*
1894	Verney, Frederick William, 6, *Onslow-gardens, S.W.*
1897	Vernon, Henry H., M.D., F.R.S.Edin., M.O.H., *Shipbrook, Cambridge-road, Southport, Lancs.*
1886	VERULAM, THE RT. HON. THE EARL OF (*Vice-President*), *Sopwell, St. Albans.*
1876	Vigers, Robert, 4, *Frederick's-place, Old Jewry, E.C.*
1885	Vincent, Frederick James, A.I.A., 38, *Queen's-road, South Hornsey, N.*
1877	Vine, Sir John Richard Somers, C.M.G., *Imperial Institute, S.W.*
1890	Walford, Ernest L., 2, *Shorter's-court, E.C.*
1890	Walkley, William Henry, 265, *Kentish Town-road, N.W.*
1868	Wallis, Charles James, 14, *Russell-square, W.C.*
1880	Wallis, E. White, 76, *Carlton-hill, N.W.*
1897	Walton, J. Herbert, *St. Ronan's, Teddington.*
1879	Wansey, Arthur H., *Sambourne, Stoke Bishop, Bristol.*
1893	Ward, William Cullen, F.S.I.A., 17, *O'Connell-street, Sydney, N.S.W.*
1888	Warren, Reginald Augustus, J.P., *Preston-place, near Worthing.*
1888	Wartnaby, William Wade, *Market Harborough, Leicestershire.*
1865	Waterhouse, Edwin, B.A., A.I.A., F.C.A., 44, *Gresham-street, E.C.*
1886	Waters, Alfred Charles, *General Register Office, Somerset House, Strand, W.C.*
1892	Wates, Charles Marshall, 9, *Dennington Park Mansions, West-end-lane, N.W.*
1894	Watson, Thomas Roberts, *Burnleigh*, 109, *Sussex-road, Southport.*

Year of Election.	
1883	Watson, T. Wilkinson, 183, *West George-street, Glasgow.*
1883	Watson, William Livingstone, *Reform Club Chambers*, 105, *Pall Mall, S.W.*
1885	*Watt, William, 17, *Queen's-road, Aberdeen.*
1888	Webb, Henry Barlow, *Holmdale, Dorking.*
1893	Weedon, Thornhill, *Bryn-Mawr, Woolloongabba, Brisbane, Queensland.*
1873	*Welby, The Right Hon. Lord, G.C.B., 11, *Stratton-street, Piccadilly, W.*
1874	Welch, Charles, F.S.A., *Guildhall, E.C.* (*Representing the Library Committee of the Corporation of the City of London.*)
1890	Weller, William Hamilton, *Portugal House, Portugal-street, Lincoln's-inn, W.C.*
1889	Wells-Smith, Henry, A.C.A., 70, *Queen-street, Sheffield.*
1855	Welton, Thomas Abercrombie, 38, *St. James's-road, Brixton, S.W.*
1879	Wenley, James Adams, *Bank of Scotland, Bank-street, Edinburgh.*
1879	*Westlake, John, Q.C., LL.D., *The River House*, 3, *Chelsea Embankment, S.W.*
1882	*Whadcoat, John Henry, F.C.A., 18, *Highbury-crescent, N.*
1883	*Whadcoat, William Edward, 54, *Carleton-road, Tufnell-park, N.*
1878	Wharton, James, *Edgehill, Netherhall-gardens, FitzJohn's-avenue, N.W.*
1887	Whinney, Frederick, 8, *Old Jewry, E.C.*
1859	Whitbread, Samuel (*Southill-park, Biggleswade, Beds.*), 10, *Ennismore-gardens, Princes-gate, S.W.*
1887	*White, The Rev. George Cecil, M.A., *Nursling Rectory, Southampton.*
1863	White, Leedham, 16, *Wetherby-gardens, South Kensington, S.W.*
1888	Whitehead, Sir James, Bart., J.P., D.L. (Alderman), *Wilmington Manor, near Dartford.*
1895	Whitehead, The Hon. Thomas Henderson, M.L.C., *Chartered Bank of India, &c., Hong Kong.*
1892	Whitelegge, B. Arthur, M.D., 3, *Edwardes-place, Kensington, W.*
1884	Whiteley, William, *Westbourne-grove, Bayswater, W.*
1895	Whittuck, Edward Arthur, M.A., B.C.L., 77, *South Audley-street, W.*
1879	*Whitwill, Mark, J.P., *Bristol.*

Year of Election	
1884	Wightman, Charles, 1, *Fenchurch-avenue, E.C.*
1895	Wilenkin, Gregory, 7, *Wetherby-gardens, South Kensington, S.W.*
1893	Wilkinson, Rev. John Frome, M.A., *Barley Rectory, Royston, Herts.*
1875	Wilkinson, Thomas Read, *Vale Bank, Knutsford, Cheshire.*
1860	Willans, John Wrigley, *Mercury Office, Leeds.*
1896	*Williams, Major Charles Woolmer, *City Carlton Club, E.C.*
1897	Williams, Daniel Thomas, *Post Office, Blaenclydach, Llynypia, R.S.O., Glam.*
1894	Williams, Edward Frederick, *Joint Stock Bank, Halifax.*
1897	*Williams, Ernest E., *Manor Lodge, Sudbury, Harrow.*
1864	Williams, Frederick Bessant, F.S.A. (Scot.), 19, *Haymarket, S.W.*
1895	Williams, Harry Mallam, F.S.A. (Scot.), *Tilehurst, Priory Park, Kew.*
1881	*Williams, Henry Maunder, 261, *Queen's-road, New Cross, S.E.*
1888	*Williams, Robert, M.P., 20, *Birchin-lane, E.C.*
1895	*Willis, J. G., B.A., *Board of Trade, Whitehall Gardens, S.W.*
1891	Wilson, Henry Joseph, M.P., *Osgathorpe Hills, Sheffield.*
1884	Wilson, James (*Deputy Commissioner*), *Rawalpindi, Punjab, India.*
1874	*Wilson, Robert Porter, 5, *Cumberland-terrace, Regent's-park, N.W.*
1895	Wood, Alfred J., *Statistical Department, Custom House, E.C.*
1897	Wood, George Henry, *Bishton-street, Corporation-road, Newport, Mon.*
1897	Woodd, Basil Aubrey Hollond, 25, *Tite-street, Chelsea, S.W.*
1887	Woodhouse, Coventry Archer, 30, *Mincing-lane, E.C.*
1890	Woollcombe, Robert Lloyd, LL.D., F.I. Inst., M.R.I.A., 14, *Waterloo-road, Dublin.*
1890	Worroll, Charles, *Colonial Mutual Life Office, Adderley-street, Cape Town.*
1895	Worsfold, Edward Mowll, *Market Square, Dover.*

Year of Election.

1878 Worsfold, Rev. John Napper, M.A.,
Haddlesey Rectory, near Selby, Yorkshire.

1887 Worthington, A. W., B.A.,
Old Swinford, Stourbridge.

1880 Wren, Walter, M.A.
7, *Powis-square, W.*

1895 Yanagisawa, Count Yasutoshi,
Mariannengasse 14, *Thür* 10, *Vienna IX.*

1886 Yerburgh, Robert Armstrong, M.P.,
25, *Kensington Gore, S.W.*

1888 *Yglesias, Miguel,
2, *Tokenhouse-buildings, E.C.*

1877 *Youll, John Gibson,
Jesmond-road, Newcastle-on-Tyne.

1897 Young, Norwood Crichton,
17, *Avenue-road, Regent's-park, N.W.*

1895 Yule, George Udny (*University College, Gower-street, W.C.*),
13, *Addison Court-gardens, Blythe-road, West Kensington, W.*

*** *The Executive Committee request that any inaccuracy in the foregoing list may be pointed out to the* Assistant Secretary, *and that all changes of address may be notified to him, so that delay in forwarding communications and the publications of the Society may be avoided.*

HONORARY FELLOWS.

HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

Honorary President.

Argentine Republic.

Year of Election.

1890. DR. FRANCISCO LATZINA, **Calle Maipu, 982, Buenos Ayres.**
Director General of Statistics; Doctor *honoris causa* of the Faculty of Physical and Mathematical Sciences of the University of Cordoba; Knight of the Italian Order of S.S. Maurice and Lazare; Officer of the Academy of France; Member of the National Academy of Sciences, of the International Statistical Institute, of the Geographical and Statistical Societies of Paris, of the Society of Commercial Geography of Paris, and Corresponding Member of the National Historical Academy of Venezuela.

Austria-Hungary.

1890. DR. KARL THEODOR VON INAMA-STERNEGG, **Vienna.**
Doctor of Political Economy; Member of the Austrian House of Lords; President of the Imperial and Royal Central Statistical Commission; Professor at the University of Vienna.

1893. DR. JOSEPH DE JEKELFALUSSY, **Budapest.**
Doctor *Juris;* Advocate; Chief of the Royal Hungarian Statistical Bureau; Ministerial Councillor; Knight of the Order of Francis Joseph; Second Vice-President of the Royal Hungarian Statistical Council; External Member of the Committee of Examiners for Political Sciences; Corresponding Member of the Hungarian Academy of Sciences.

1893. DR. FRANZ RITTER VON JURASCHEK, **Kärnthnerstrasse, 55, Vienna.**
Doctor *Juris et Philosophiæ;* "K.K. Regierungsrath;" Member and Secretary of the Imperial and Royal Central Statistical Commission; Professor at the University of Vienna; Professor of Public Law and of Statistics at the Military Academies, Vienna; Knight of the Austrian Order of the Iron Crown (3rd Class); Officer of the Order of the Crown of Italy; Member of the Permanent Commission for Commercial Values; of the International Statistical Institute; and of the British Economic Association.

Year of Election. **Austria-Hungary**—*Contd.*

1893. JOSEPH KÖRÖSI, **Budapest.**
Director of the Municipal Statistical Bureau of Budapest; *Docent* at the University of Budapest; President of the Municipal Statistical Committee; Knight of Several Orders; Member of the Statistical Commissions of Hungary, Belgium, and Nijni-Novgorod; Honorary Member of the American Statistical Associations; Member of the Hungarian Academy of Science, of the International Statistical Institute, of the Statistical Societies of Manchester and Paris, of the British Economic Asssociation, and of several other learned Societies.

1877. MAX WIRTH, **VI Dreihufeisengasse, Vienna.**
Economist; formerly Director of the Federal Statistical Bureau of Switzerland; Co-Editor of the "Neue Freie Presse."

Belgium.

1879. DR. EUGÈNE JANSSENS, **Rue du Lombard, 21, Brussels.**
Doctor of Medicine; Chief Inspector of the Board of Health of the City of Brussels; President of the Federal Committee of Health of the Brussels District; Member of the Central Statistical Commission, of the Superior Council of Health, of the Royal Academy of Medicine, and of the Local Medical Commission; Officer of the Belgian Order of Leopold and of the Italian Order of SS. Maurice and Lazare; Knight of the French Legion of Honour; Civic Cross of the 1st Class; Officer of the Academy of France; Associate of the Statistical Society of Paris and of the International Statistical Institute.

China.

1890. SIR ROBERT HART, Baronet, G.C.M.G., LL.D., **Peking.**
Inspector-General of Imperial Maritime Customs, China

Denmark.

1878. VIGAND ANDREAS FALBE-HANSEN, **Copenhagen.**
Professor of Political Economy at the University of Copenhagen.

1852. DR. PETER ANTON SCHLEISNER, **Frederiksberg, Copenhagen.**
Doctor of Medicine, State Councillor; Knight and Bachelor of the Order of the "Dannebroge," and Knight of the Swedish Order of the North Star; President of the Royal Danish Institute of Vaccination; Member of the Royal Danish General Board of Health.

France.

Year of Election.

1880. DR. JACQUES BERTILLON, **1, Avenue Victoria, Paris.**
Doctor of Medicine; Chief of the Statistical Department of the City of Paris; Member of the Superior Council of Statistics; of the Consultative Committee of Public Hygiene of France; and of the Statistical Society of Paris, &c.

1856. MAURICE BLOCK, **63, Rue de l'Assomption, Paris.**
Knight of the Legion of Honour, and of Orders of Sweden, Russia, Prussia, Bavaria, Austria-Hungary, Greece, Italy, and Portugal; Member of the Institute of France, of the Superior Council of Statistics, of the International Statistical Institute, of the Society of Political Economy of Paris, and of many Academies and Scientific Societies.

1879. DR. ARTHUR CHERVIN, **82, Avenue Victor Hugo, Paris.**
Doctor of Medicine and Surgery; Director of the Paris Institute for Stammerers; Member of the Superior Council of Statistics and of the International Statistical Institute, &c.

1897. JEAN JACQUES ÉMILE CHEYSSON, **4, Rue Adolphe Yvon, Paris.**
Inspector-General of Bridges and Highways; Member of the International Statistical Institute; Past President of the Statistical Society of Paris; late Director of the Creusot Iron Works, of Machinery at the Paris Exhibition of 1867, and of Graphic Statistics for the Ministry of Public Works.

1878. MAXIMIN DELOCHE, **5, Rue Herschel, Paris.**
Honorary Director of the General Statistics of France; Commander of the Legion of Honour; Officer of the Order of Public Instruction; Commander of the Austrian Order of Francis Joseph; Member of the Institute of France, and of several learned societies.

1890. ALFRED DE FOVILLE, **Hotel des Monnaies, Paris.**
Master of the Mint; Professor at the National Conservatoire of Arts and Trades (Chair of Industrial Economy and Statistics); Officer of the Legion of Honour; Laureate of the Institute of France; Past President of the Statistical Society of Paris; Member of the International Statistical Institute and of the Superior Council of Statistics.

1870. DR. CLÉMENT JUGLAR, **167, Rue St. Jacques, Paris.**
Member of the Institute of France; Past President of the Statistical Society of Paris; Vice-President of the Society of Political Economy of Paris.

Year of Election.

France—*Contd.*

1860. PIERRE ÉMILE LEVASSEUR, **26, Rue Monsieur le Prince, Paris.**

Member of the Institute of France; Professor at the College of France and at the Conservatoire of Arts and Trades; President of the Statistical Commission for Primary Instruction; Past President of the Statistical Society of Paris; Vice-President of the International Statistical Institute, of the Superior Council of Statistics, and of the Society of Political Economy, &c.

1887. DANIEL WILSON, **2, Avenue d'Jéna, Paris.**

Deputy; Ex-Under-Secretary of State; Past President of the Statistical Society of Paris.

1876. THE PRESIDENT (for the time being) OF THE STATISTICAL SOCIETY OF PARIS, **28, Rue Danton, Paris.**

Germany.

1871. SIR HENRY PAGE-TURNER BARRON, Baronet, C.M.G.

Late British Minister-Resident to the King of Wurttemberg.

1890. KARL JULIUS EMIL BLENCK, **Lindenstrasse, 28, Berlin, S.W.**

"Geheimer Ober-Regierungsrath;" Director of the Royal Statistical Bureau of Prussia, also Member of the Prussian Central Statistical Commission and of the Central Board of Control of the Survey of Prussia; Honorary Member or Member of several learned Societies.

1896. DR. CARL VICTOR BÖHMERT, **Hospitalstrasse 4, Dresden.**

"Geheimer Regierungsrath;" Doctor *Juris;* Late Director of the Statistical Bureau of Saxony; Professor of Political Economy and Statistics in the Polytechnical High School of Dresden.

1877. DR. GEORG VON MAYR, **Kaiser Wilhelmstrasse, 5, Strassburg.**

Ex-Under Secretary of State in the Imperial Ministry for Alsace-Lorraine; formerly Director of the Royal Statistical Bureau of Bavaria; Honorary Member of the International Statistical Institute; Honorary Professor at the University of Strassburg; Associate of the Statistical Society of Paris.

1893. DR. FRIEDRICH WILHELM HANS VON SCHEEL, **Lützow-Ufer, 6/8, Berlin, W.**

"Kaiserlicher Geheimer Regierungsrath;" Doctor *Juris et philosophiæ;* Director of the Imperial Statistical Bureau of the German Empire; formerly Professor of Political Economy and Statistics at the University of Bern; Honorary Member of the Statistical and Social Inquiry Society of Ireland.

1860. DR. GEORG KARL LEOPOLD SEUFFERT, **Maximiliansplatz, Nr. 9/3, Munich.**

Formerly Chief Inspector and Director of the Royal Custom-House at Simbach; Knight of the Bavarian Order of St. Michael 1st Class; Corresponding Member of the Central Statistical Commission of Belgium; Member of the "Freies Deutsches Hochstift zu Frankfurt a/M."

Year of Election.

Germany—*Contd.*

1897. DR. ADOLPH WAGNER, Ph.D., **51, Lessingstrasse, Berlin, N.W.**
Professor of Political Economy at the University of Berlin; Member of the Statistical Bureau of Prussia.

1876. THE PRESIDENT (for the time being) OF THE GEOGRAPHICAL AND STATISTICAL SOCIETY OF FRANKFORT. **Stadtbibliothek, Frankfort.**

Italy.

1879. DR. GEROLAMO BOCCARDO, **Piazzia Santi Apostoli, 74, Rome.**
Senator; Councillor of State; Doctor of Laws; late Professor at the University and at the Superior Naval School of Genoa; Grand Officer of the Orders of SS. Maurice and Lazare, and of the Crown of Italy; Knight of the Order of Civil Merit of Savoy; Member of the Academy "dei Lincei," of the Academy of Naples, of the Institutes of Science of Milan, Venice, and Palermo, of the Cobden Club, of the International Statistical Institute, of the Academy of Madrid, and of the Deputation of National History, &c.

1874. DR. LUIGI BODIO, **Rome.**
Doctor of Laws; Professor of Industrial Legislation and of Statistics at the Engineering College, Rome; Director-General of the Statistical Department of the State; Grand Officer of the Order of SS. Maurice and Lazare; Knight of the Order of Civil Merit of Savoy; Correspondent of the Institute of France (Academy of Moral and Political Sciences).

1845. FRANCESCO FERRARA, **Venice.**
Senator; Professor and Director of the Royal Superior School of Commerce at Venice; late Minister of Finance; Member of the Academy "dei Lincei."

1880. ANGELO MESSEDAGLIA, **Rome.**
Senator; Professor of Statistics at the Royal University of Rome; Member of the Academy "dei Lincei."

1868. THE MARQUIS ERMENEGILDO DEI CINQUE QUINTILI, **Rome.**
Advocate; General Secretary of the Hospitals Commission of Rome.

Mexico.

1895. DON MANUEL FERNANDEZ LEAL, **Mexico.**
Secretary of State, Department of "Fomento," Colonization and Industry. Mexico.

Netherlands.

1896. DR. NICOLAAS GERARD PIERSON, **The Hague.**
Late Minister of Finance; Late President of the Netherlands' Bank; Late Professor of Political Economy at the University of Amsterdam.

1893. DR. VERKERK WILLIAM ARNOLD PETER PISTORIUS, **The Hague.**
Resident Minister, General Secretary to the Ministry of Foreign Affairs.

Roumania.

Year of Election.

1896. GRÉGOIRE P. OLANESCO. **Rue Grivitza 36, Bucharest.**
Late Director-General of Customs; Late General Secretary, Ministry of Finance; Officer of the Legion of Honor; Member of the International Statistical Institute.

Russia.

1873. HIS EXCELLENCY PIERRE SEMENOV, **St. Petersburg.**
Senator; Privy Councillor to His Imperial Majesty; President of the Imperial Statistical Council; President of the Imperial Geographical Society; Honorary Member of the Academy of Sciences in St. Petersburg; Associate of the Statistical Society of Paris.

1890. HIS EXCELLENCY NICOLAS TROÏNITSKY, **Kovenskoy-pereoulok, Nr 9, St. Petersburg.**
Former Governor; Privy Councillor; Director of the Central Statistical Committee of the Ministry of the Interior; Life Member of the Statistical Council, of the Imperial Geographical Society of Russia, and of the International Statistical Institute, and Member of the Statistical Society of Paris.

Spain.

1845. HIS EXCELLENCY SEÑOR DON JOSÉ MAGAZ Y JAYME, **Calle de Leon, 13, Madrid.**
Advocate, Gentleman of His Majesty's Chamber, and Member of the Council of State; Ex-Deputy of the Cortes; Ex-Senator; Ex-Director-General of Treasury; Ex-Under-Secretary of the Ministry of Finance; Grand Cross of the Order of Isabella Catolica; Commander of the Order of Carlos 3º.

Sweden and Norway.

1858. DR. THORKIL HALVORSEN ASCHEHOUG, **41, Josephinegade Christiania.**
Doctor of Laws; Professor of Political Economy at the University of Christiania; Assessor Extraordinary of the Supreme Court of Norway; Commander of the First Class of the Norwegian Order of St. Olave, of the Swedish Order of the North Star; and of the Danish Order of the "Dannebroge;" Corresponding Member of the Institute of France; Member of the Institute of International Law, of the International Statistical Institute, and of the Academies of Christiania, Stockholm, Trondhjem and Upsala, also of the Royal Historical Society of Denmark.

1874. ANDERS NICOLAI KIÆR, **Christiania.**
Director of the Central Statistical Bureau of Norway; Associate of the Statistical Society of Paris.

1860. THOMAS MICHELL, C.B.
Late Her Majesty's Consul-General for Norway.

Year of Election.

Sweden and Norway—*Contd.*

1890. DR. ELIS SIDENBLADH., Ph.D., **Stockholm.**
Director in Chief of the Central Statistical Bureau of Sweden; President of the Royal Statistical Commission; Commander, Officer, and Knight of several Swedish and Foreign Orders; Member of the Royal Academies of Sciences and of Agriculture, at Stockholm; Honorary and Corresponding Member of several foreign learned Societies.

Switzerland.

1890. DR. LOUIS GUILLAUME, **Bern.**
Doctor of Medicine; Director of the Federal Statistical Bureau; Secretary of the International Penitentiary Commission.

United States.

1873. THE HON. WILLIAM BARNES, **Thurlow-terrace, Albany, N.Y.**
Lawyer; Ex-Superintendent of the Insurance Department, State of New York.

1881. DR. JOHN SHAW BILLINGS, **New York Public Library, New York City.**
A.M., M.D., LL.D., Edinburgh and Harvard; D.C.L., Oxon; Surgeon, U.S. Army; Member of the National Academy of Sciences, &c.

1896. WORTHINGTON CHAUNCEY FORD, **Treasury Department, Bureau of Statistics. Washington, D.C., U.S.A.**
Chief of the Bureau of Statistics, Treasury Department; Chief of the Bureau of Statistics, Department of State; Member of the International Statistical Institute.

1890. DR. RICHMOND MAYO-SMITH, M.A., Ph.D., **Columbia College, New York.**
Professor of Political Economy and Social Science in Columbia College; Vice-President of the American Statistical Association; Member of the International Statistical Institute, and of the National Academy of Sciences.

1870. THE HON. JOHN ELIOT SANFORD, **Taunton, Mass.**
Lawyer; Ex-Speaker of the House of Representatives; Ex-Insurance Commissioner; Ex-Chairman of the Board of Harbour and Land Commissioners; Chairman of the Board of Railroad Commissioners.

1870. THE HON. DAVID AMES WELLS, D.C.L., LL.D., M.D., **Norwich, Conn.**
Economist; Late Special Commissioner of Revenue of the United States; Chairman of Commission for the Revision of Taxes of the State of New York; Lecturer on the Principles and Practice of Taxation, Harvard University, Cambridge, United States; Member of the Board of Arbitration of American Railways; President, National Board of Visitors of the U.S. Military Academy of West Point; President of the American Social Science Association, and of the American Free Trade League; Chairman in 1883 of the Department of Finance of the American Social Science Association; Corresponding Member of the Institute of France, to fill vacancy occasioned by the death of John Stuart Mill; Corresponding Member of the Academy "dei Lincei," Rome; Member of the American Academy of Arts and Sciences, Boston; Honorary Member of the Cobden Club; Gold Medallist "Exposition Universelle, France, 1889, Groupe de l'Economie Sociale."

Year of Election.

United States—*Contd.*

1893. THE HON. CARROLL DAVIDSON WRIGHT, **Washington.**
Commissioner of the U.S. Department of Labour; late Chief of the Massachusetts Bureau of Statistics of Labour; President of the Association for the promotion of Profit Sharing; late President and now Vice-President of the American Social Science Association; Vice-President of the American Statistical Association; Member of the American and British Economic Associations, of the International Statistical Institute, and of several other learned Societies.

1877. DR. EDWARD YOUNG, A.M., Ph.D., **207, Maryland Avenue, N.E., Washington, U.S.A.**
Late Consul of the United States; formerly Chief of the Bureau of Statistics, United States of America; Member of the Geographical Society of Paris.

India.

1886. JAMES EDWARD O'CONOR, C.I.E., **Calcutta and Simla.**
Director-General of Statistics; Assistant Secretary with the Supreme Government, India, Department of Finance and Commerce.

Dominion of Canada.

1894. GEORGE JOHNSON, **Ottawa.**
Statistician, Department of Agriculture, Ottawa, Canada.

New South Wales.

1893. TIMOTHY AUGUSTINE COGHLAN, **Sydney.**
Government Statistician of New South Wales and Registrar of Friendly Societies and Trade Unions; formerly Assistant Engineer for Harbours and Rivers.

1876. EDWARD GRANT WARD, J.P., **Sydney.**
Late Registrar-General; Chairman of Board of Land Titles Commissioners.

New Zealand.

1876. SIR JAMES HECTOR, K.C.M.G., M.D., F.R.S.S. L. and E., F.G.S. &c., **Wellington.**
Director of the Geological Survey, of the Meteorological Department, and of the New Zealand Institute, &c.

Tasmania.

Year of Election.

1894. ROBERT MACKENZIE JOHNSTON, **Hobart.**
Registrar-General and Government Statistician; Fellow and Member of Council of the Royal Society of Tasmania; Member of Council and of Senate of the University of Tasmania; Fellow and Past President of Section F (*Economics* and *Statistics*) of the Australasian Association for the Advancement of Science; Fellow of the Royal Geographical Society of Australia; Honorary Foreign Corresponding Member of the Geological Society of Edinburgh; Fellow of the Linnean Society of London.

1876. EDWIN CRADOCK NOWELL, J.P., **Hobart.**
Clerk of Executive and Legislative Councils of Tasmania; late Government Statistician; Clerk to the Federal Council of Australasia in its four Sessions.

Victoria.

1858. WILLIAM HENRY ARCHER, K.C.P., K.S.G., F.I.A., F.L.S., &c., **Grace Park, Hawthorne, Melbourne.**
Barrister-at-Law.

Great Britain and Ireland.

1876. THE PRESIDENT (for the time being) OF THE MANCHESTER STATISTICAL SOCIETY, **63, Brown Street, Manchester.**

1876. THE PRESIDENT (for the time being) OF THE STATISTICAL AND SOCIAL INQUIRY SOCIETY OF IRELAND, **35, Molesworth Street, Dublin.**

NOTE.—The Executive Committee request that any inaccuracies in the foregoing List of HONORARY FELLOWS may be pointed out, and that all changes of address may be notified to the Secretary, so that delay in forwarding communications and the publications of the Society may be avoided.

ROYAL STATISTICAL SOCIETY.

Copy of Charter.

Victoria, by the Grace of God of the United Kingdom of Great Britain and Ireland Queen, Defender of the Faith.

To all to whom these Presents shall come, Greeting:—

Whereas Our Right trusty and entirely beloved cousin, Henry, Third Marquess of Lansdowne, Knight of the Most Noble Order of the Garter, Charles Babbage, Fellow of the Royal Society, John Elliott Drinkwater, Master of Arts, Henry Hallam, Fellow of the Royal Society, the Reverend Richard Jones, Master of Arts, and others of Our loving subjects, did, in the year One thousand eight hundred and thirty-four, establish a Society to collect, arrange, digest and publish facts, illustrating the condition and prospects of society in its material, social, and moral relations; these facts being for the most part arranged in tabular forms and in accordance with the principles of the numerical method, and the same Society is now called or known by the name of "The "Statistical Society."

And Whereas it has been represented to Us that the same Society has, since its establishment, sedulously pursued such its proposed objects, and by its publications (including those of its transactions), and by promoting the discussion of legislative and other public measures from the statistical point of view, has greatly contributed to the progress of statistical and economical science.

And Whereas distinguished individuals in foreign countries, as well as many eminent British subjects, have availed themselves of the facilities offered by the same Society for communicating important information largely extending statistical knowledge; and the general interest now felt in Statistics has been greatly promoted and fostered by this Society.

And Whereas the same Society has, in aid of its objects, collected a large and valuable library of scientific works and charts, to which fresh accessions are constantly made; and the said Society has hitherto been supported by annual and other subscriptions and contributions to its funds, and has lately acquired leasehold premises in which the business of the said Society is carried on.

And Whereas in order to secure the property of the said Society, to extend its operations, and to give it its due position among the Scientific Institutions of Our kingdom, We have been besought to grant to Sir Rawson William Rawson, Knight Com-

mander of the Most Distinguished Order of St. Michael and St. George, and Companion of the Most Honourable Order of the Bath, and to those who now are Members of the said Society, or who shall from time to time be elected Fellows of the Royal Statistical Society hereby incorporated, Our Royal Charter of Incorporation for the purposes aforesaid.

1. **Now Know Ye** that We, being desirous of encouraging a design so laudable and salutary, of Our especial grace, certain knowledge and mere motion, have willed, granted, and declared and Do by these Presents, for Us, Our heirs and successors, will, grant, and declare that the said Sir Rawson William Rawson, Knight Commander of the Most Distinguished Order of St. Michael and St. George, and Companion of the Most Honourable Order of the Bath, and such other of Our loving subjects as now are Members of the said Society, or shall from time to time be elected Fellows of "The Royal Statistical Society" hereby incorporated according to such regulations or bye laws as shall be hereafter framed or enacted, and their successors, shall for ever hereafter be by virtue of these presents one body politic and corporate, by the name of **"The Royal Statistical Society,"** and for the purposes aforesaid, and by the name aforesaid, shall have perpetual succession and a common seal, with full power and authority to alter, vary, break, and renew the same at their discretion, and by the same name to sue and be sued, implead and be impleaded, answer and be answered, unto and in every Court of Us, Our heirs and successors.

2. **The** Royal Statistical Society, in this Charter hereinafter called "The Society," may, notwithstanding the statutes of mortmain, take, purchase, hold and enjoy to them and their successors a hall, or house, and any such messuages or hereditaments of any tenure as may be necessary, for carrying out the purposes of the Society, but so that the yearly value thereof to be computed at the rack rent which might be gotten for the same at the time of the purchase or other acquisition, and including the site of the said hall, or house, do not exceed in the whole the sum of Two thousand pounds.

3. **There** shall be a Council of the Society, and the said Council and General Meetings of the Fellows to be held in accordance with this Our Charter shall, subject to the provisions of this Our Charter, have the entire management and direction of the concerns of the Society.

4. **There** shall be a President, Vice-Presidents, a Treasurer or Treasurers, and a Secretary or Secretaries of the Society. The Council shall consist of the President, Vice-Presidents, and not

less than twenty Councillors; and the Treasurer or Treasurers and the Secretary or Secretaries if honorary.

5. **The** several persons who were elected to be the President, Vice-Presidents, and Members of the Council of the Statistical Society at the Annual Meeting held in the month of June, One thousand eight hundred and eighty-six, shall form the first Council of the Society, and shall continue in office until the first Election of officers is made under these presents as hereinafter provided.

6. **General** Meetings of the Fellows of the Society may be held from time to time, and at least one General Meeting shall be held in each year. Every General Meeting may be adjourned, subject to the provisions of the Bye Laws. The following business may be transacted by a General Meeting, viz.:—

(*a.*) The Election of the President, Vice-Presidents, Treasurer or Treasurers, Secretary or Secretaries, and other Members of the Council of the Society.

(*b.*) The making, repeal, or amendment of Bye Laws.

(*c.*) The passing of any proper resolution respecting the affairs of the Society.

7. **Bye Laws** of the Society may be made for the following purposes, and subject to the following conditions, viz.:—

(*a.*) For prescribing the qualification and condition of tenure of office of the President; the number, qualifications, functions, and conditions of tenure of office of the Vice-Presidents, Treasurers, Secretaries, and Members of Council, and Officers of the Society; for making regulations with respect to General Meetings and Meetings of the Council and proceedings thereat, and for the election of any persons to be Honorary Fellows or Associates of the Society, and defining their privileges (but such persons, if elected, shall not be Members of the Corporation), and for making regulations respecting the making, repeal and amendment of Bye Laws, and generally for the government of the Society and the management of its property and affairs.

(*b.*) The first Bye Laws shall be made at the first General Meeting to be held under these presents, and shall (amongst other things) prescribe the time for holding the first election of officers under these presents.

8. **The** General Meetings and adjourned General Meetings of the Society shall take place (subject to the rules or bye laws of the Society, and to any power of convening or demanding a

Special General Meeting thereby given) at such times and places as may be fixed by the Council.

9. **The** existing rules of the Statistical Society, so far as not inconsistent with these presents, shall be in force as the Bye Laws of the Society until the first Bye Laws to be made under these presents shall come into operation.

10. **Subject** to these presents and the Bye Laws of the Society for the time being, the Council shall have the sole management of the income, funds, and property of the Society, and may manage and superintend all other affairs of the Society, and appoint and dismiss at their pleasure all salaried and other officers, attendants, and servants as they may think fit, and may do all such things as shall appear to them necessary or expedient for giving effect to the objects of the Society.

11. **The** Council shall once in every year present to a General Meeting a report of the proceedings of the Society, together with a statement of the receipts and expenditure, and of the financial position of the Society, and every Fellow of the Society may, at reasonable times to be fixed by the Council, examine the accounts of the Society.

12. **The** Council may, with the approval of a General Meeting, from time to time appoint fit persons to be Trustees of any part of the real or personal property of the Society, and may make or direct any transfer of such property so placed in trust necessary for the purposes of the trust, or may, at their discretion, take in the corporate name of the Society conveyances or transfers of any property capable of being held in that name. Provided that no sale, mortgage, incumbrance, or other disposition of any hereditaments belonging to the Society shall be made unless with the approval of a General Meeting.

13. **No** Rule, Bye Law, Resolution, or other proceeding shall be made or had by the Society, or any meeting thereof, or by the Council, contrary to the general scope or true intent and meaning of this Our Charter, or the laws or statutes of Our Realm, and anything done contrary to this present clause shall be void.

In Witness whereof We have caused these Our Letters to be made Patent.

Witness Ourself, at Westminster, the thirty-first day of January, in the fiftieth year of Our Reign.

By Warrant under the Queen's Sign Manual,

L. S.

MUIR MACKENZIE.

ROYAL STATISTICAL SOCIETY.

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RULES AND BYE-LAWS OF THE ROYAL STATISTICAL SOCIETY.

Objects of the Society.

1. The objects of the Royal Statistical Society are to collect, arrange, digest and publish facts, illustrating the condition and prospects of society in its material, social and moral relations; these facts being for the most part arranged in tabular forms and in accordance with the principles of the numerical method.

The Society collects new materials, condenses, arranges, and publishes those already existing, whether unpublished or published in diffuse and expensive forms in the English or in any foreign language, and promotes the discussion of legislative and other public measures from the statistical point of view. These discussions form portions of the published Transactions of the Society.

Constitution of the Society.

2. The Society consists of Fellows and Honorary Fellows, elected in the manner hereinafter described.

Number of Fellows and Honorary Fellows.

3. The number of Fellows is unlimited. Foreigners or British subjects of distinction residing out of the United Kingdom may be admitted as Honorary Fellows, of whom the number shall not be more than seventy at any one time.

Proposal of Fellows.

4. Every Candidate for admission as a Fellow of the Society shall be proposed by two or more Fellows, who shall certify from their personal knowledge of him or of his works, that he is a fit person to be admitted a Fellow of the Society. Every such certificate having been read and approved of at a Meeting of the Council, shall be suspended in the office of the Society until the following Ordinary Meeting, at which the vote shall be taken.

Election of Fellows.

5. In the election of Fellows, the votes shall be taken by ballot. No person shall be admitted unless at least sixteen Fellows vote, and unless he have in his favour three-fourths of the Fellows voting.

Admission of Fellows.

6. Every Fellow elect is required to take the earliest opportunity of presenting himself for admission at an Ordinary Meeting of the Society.

The manner of admission shall be thus:—

Immediately after the reading of the minutes, the Fellow elect, having first paid his subscription for the current year or his composition, shall sign the obligation contained in the Fellowship-book, to the effect following:—

"We, who have underwritten our "names, do hereby undertake, each for "himself, that we will endeavour to "further the good of the Royal Statis-"tical Society for improving Statistical "Knowledge, and the ends for which "the same has been founded; that we "will be present at the Meetings of the "Society as often as conveniently we "can, and that we will keep and fulfil "the Bye-laws and Orders of this "Society: provided that whensoever "any one of us shall make known, by "writing under his hand, to the Secre-"taries for the time being, that he "desires to withdraw from the Society, "he shall be free thenceforward from "this obligation."

Whereon the President, taking him by the hand, shall say,—"By the "authority, and in the name of the "Royal Statistical Society, I do admit "you a Fellow thereof."

Upon their admission Fellows shall have the right of attaching to their names the letters F.S.S., but not in connection with any trading or business advertisement other than the publication of any book or literary notice.

Admission of Honorary Fellows.

7. There shall be Two Meetings of the Society in the year, on such days as shall be hereafter fixed by the Council, at which Honorary Fellows may be elected.

No Honorary Fellow can be recommended for election but by the Council. At any Meeting of the Council any Member thereof may propose a Foreigner or British subject of distinction residing out of the United Kingdom, delivering at the same time a written statement of the qualifications of, offices held by, and published works of, the person proposed; and ten days' notice at least shall be given to every Member of the Council, of the day on which the Council will vote by ballot on the question whether they will recommend to the Society the election of the person proposed. No such recommendation to the Society shall be adopted unless at least three-fourths of the votes are in favour thereof.

Notice of the recommendation shall be given from the chair at the Meeting of the Society next preceding that at which the vote shall be taken thereon. No person shall be elected an Honorary Fellow unless sixteen Fellows vote and three-fourths of the Fellows voting be in his favour.

The Council shall have power to elect as Honorary Fellows, the Presidents for the time being of the Statistical Societies of Dublin, Manchester, and Paris, and the President of any other Statistical Society at home or abroad.

Payments by Fellows.

8. Every Fellow of the Society shall pay a yearly subscription of Two Guineas, or may at any time compound for his future yearly payments by paying at once the sum of Twenty Guineas,* unless the Annual Subscription or Composition Fee shall be remitted by the Council; provided that the number of Fellows whose Annual Subscription or Composition Fee shall have been thus remitted, do not exceed five at any one time.

Defaulters.—Withdrawal of Fellows.

9. All yearly payments are due in advance on the 1st of January, and if any Fellow of the Society have not paid his subscription before the 1st of July, he shall be applied to in writing by the Secretaries, and if the same be not paid before the 1st of January of the second year, a written application shall again be made by the Secretaries, and the Fellow in arrear shall cease to receive the Society's publications, and shall not be entitled to any of the privileges of the Society until such arrears are paid; and if the subscription be not discharged before the 1st of February of the second year, the name of the Fellow thus in arrear shall be exhibited on a card suspended in the office of the Society; and if, at the next Annual General Meeting, the amount still remain unpaid, the defaulter shall, unless otherwise authorised by the Council, be announced to be no longer a Fellow of the Society, the reason for the same being at the same time assigned. No Fellow of the Society can withdraw his name from the Society's books, unless all arrears be paid; and no resignation will be deemed valid unless a written notice thereof be communicated to the Secretaries. No Fellow shall be entitled to vote at any Meeting of the Society until he shall have paid his subscription for the current year.

Expulsion of Fellows.

10. If any Fellow of the Society, or any Honorary Fellow, shall so demean himself that it would be for the dishonour of the Society that he longer continue to be a Fellow or Honorary Fellow thereof, the Council shall take the matter into consideration; and if the majority of the Members of the Council present at some Meeting (of which and of the matter in hand such Fellow or Honorary Fellow, and every Member of the Council, shall have due notice) shall decide by ballot to recommend that such Fellow or Honorary Fellow be expelled from the Society, the President shall at its next Ordinary Meeting announce to the Society the recommendation of the Council, and at the following Meeting the question shall be decided by ballot, and if at least three-fourths of the

* Cheques should be made payable to "The Royal Statistical Society," and crossed "Messrs. "Drummond and Co."

number voting are in favour of the expulsion, the President shall forthwith cancel the name in the Fellowship-book, and shall say,—

"By the authority and in the name "of the Royal Statistical Society, I do "declare that A. B. (naming him) is no "longer a Fellow (or Honorary Fellow) "thereof."

And such Fellow or Honorary Fellow shall thereupon cease to be of the Society.

Trustees.

11. The property of the Society may be vested in three Trustees, chosen by the Fellows. The Trustees are eligible to any other offices in the Society.

President, Council, and Officers.

12. The Council shall consist of a President and thirty Members, together with the Honorary Vice-Presidents.

From the Council shall be chosen four Vice-Presidents, a Treasurer, the Honorary Secretaries, and a Foreign Secretary, who may be one of the Honorary Secretaries. The former Presidents who are continuing Fellows of the Society shall be Honorary Vice-Presidents. Any five of the Council shall be a quorum.

Election of President and Officers.

13. The President, Members of Council, Treasurer, and Honorary and Foreign Secretaries shall be chosen annually by the Fellows at the Annual General Meeting.

The Vice-Presidents shall be chosen annually from the Council by the President.

The President shall not be eligible for the office more than two years in succession.

Six Fellows, at least, who were not of the Council of the previous year, shall be annually elected; and of the Members retiring three at least shall be those who have served longest continuously on the Council, unless they hold office as Treasurer or Honorary or Foreign Secretary.

Nomination of President, Council, and Officers.

14. The Council shall, previously to the Annual General Meeting, nominate, by ballot, the Fellows whom they recommend to be the next President and Council of the Society. They shall also recommend for election a Treasurer and the Secretaries (in accordance with Rule 12). Notice shall be sent to every Fellow whose residence is known to be within the limits of the metropolitan post, at least a fortnight before the Annual General Meeting, of the names of Fellows recommended by the Council.

Extraordinary Vacancies.

15. On any extraordinary vacancy occurring of the Office of President, or other Officer of the Society, the Honorary Secretaries shall summon the Council with as little delay as possible, and a majority of the Council, thereupon meeting in their usual place, shall, by ballot, and by a majority of those present, choose a new President, or other Officer of the Society, to be so until the next Annual General Meeting.

Committees.

16. The Council shall have power to appoint Committees of Fellows and also an Executive Committee of their own body. The Committees shall report their proceedings to the Council. No report shall be communicated to the Society except by the Council.

Auditors.

17. At the first Ordinary Meeting of each year, the Fellows shall choose two Fellows, not being Members of the Council, as Auditors, who, with one of the Council, chosen by the Council, shall audit the Treasurer's accounts for the past year, and report thereon to the Society, which report shall be presented at the Ordinary Meeting in February. The Auditors shall be empowered to examine into the particulars of all expenditure of the funds of the Society and may report their opinion upon any part of it.

Meetings Ordinary and General.

18. The Ordinary Meetings of the Society shall be held monthly, or oftener, during the Session, which shall be from the 1st of November to the 1st of July in each year, both inclusive, on such days and at such hours as the Council shall declare. The Annual General Meeting shall be held on such day in the month of June of each year as shall be appointed by the Council for the time being.

Business of Ordinary Meetings.

19. The business of the Ordinary Meetings shall be to elect and admit Fellows, to read and hear reports, letters, and papers on subjects interesting to the Society. Nothing relating to the bye-laws or management of the Society shall be discussed at the Ordinary Meetings, except that the Auditors' Report shall be presented at the Ordinary Meeting in February, and that the Minutes of the Annual General Meeting, and of every Special General Meeting, shall be submitted for confirmation at the next Ordinary Meeting after the day of such Annual or Special General Meeting. Strangers may be introduced to the Ordinary Meetings, by any Fellow, with the leave of the President, Vice-President, or other Fellow presiding at the Meeting.

Business of Annual General Meeting.

20. The business of the Annual General Meeting shall be to elect the Officers of the Society, and to discuss questions on its bye-laws and management. No Fellow or Honorary Fellow shall be proposed at the Annual General Meeting. No Fellow shall propose any alteration of the rules or bye-laws of the Society at the Annual General Meeting, unless after three weeks' notice thereof given in writing to the Council, but amendments to any motion may be brought forward without notice, so that they relate to the same subject as the motion. The Council shall give fourteen days' notice to every Fellow of all questions of which such notice shall have been given to them.

Special General Meetings

21. The Council may, at any time, call a Special General Meeting of the Society when it appears to them necessary. Any twenty Fellows may require a Special General Meeting to be called, by notice in writing signed by them, delivered to one of the Secretaries, specifying the questions to be moved. The Council shall, within one week of such notice, appoint a day for such Special General Meeting, and shall give at least one week's notice of every Special General Meeting, and of the questions to be moved, to every Fellow within the limits of the metropolitan post, whose residence is known. No business shall be brought forward at any Special General Meeting other than that specified in the notice convening the same.

Duties of the President.

22. The President shall preside at all Meetings of the Society, Council, and Committees which he shall attend, and in case of an equality of votes, shall have a second or casting vote. He shall sign all diplomas of admission of Honorary Fellows. He shall admit and expel Fellows and Honorary Fellows, according to the bye-laws of the Society.

Duties of the Treasurer.

23. The Treasurer shall receive all moneys due to, and pay all moneys owing by, the Society, and shall keep an account of his receipts and payments. No sum exceeding Ten Pounds shall be paid but by order of the Council, excepting always any lawful demand for rates or taxes. The Treasurer shall invest the moneys of the Society in such manner as the Council shall from time to time direct.

Duties of the Honorary Secretaries.

24. The Honorary Secretaries shall, under the control of the Council, conduct the correspondence of the Society; they or one of them shall attend all Meetings of the Society and Council, and shall duly record the Minutes of the Proceedings. They shall issue the requisite notices, and read such papers to the Society as the Council may direct.

Powers of the Vice-Presidents.

25. A Vice-President, whether Honorary or nominated, in the chair, shall act with the power of the President in presiding and voting at any Meeting of the Society or Council, and in admitting Fellows; but no Vice-President shall be empowered to sign diplomas of admission of Honorary Fellows, or to expel Fellows or Honorary Fellows. In the absence of the President and Vice-Presidents, any Member of Council may be called upon by the Fellows then present, to preside at an Ordinary or Council Meeting, with the same power as a Vice-President.

Powers of the Council.

26. The Council shall have control over the papers and funds of the Society, and may, as they shall see fit, direct the publication of papers and the expenditure of the funds, in accordance with the provisions of the Charter.

27. The Council shall be empowered at any time to frame Regulations not inconsistent with these bye-laws, which shall be and remain in force until the next Annual General Meeting, at which they shall be either affirmed or annulled; but no Council shall have power to renew Regulations which have once been disapproved at an Annual General Meeting.

28. The Council shall have the custody of the Common Seal. The Common Seal shall not be affixed to any instrument, deed, or other document, except by order of the Council and in the presence of at least two Members of the Council and in accordance with such other regulations as the Council shall from time to time prescribe. The fact of the seal having been so affixed shall be entered on the minutes of the Council.

29. No Dividend, Gift, Division, or Bonus in money shall be made by the Society, unto or between any of the Fellows or Members, except as hereinafter provided.

30. The Council shall publish a Journal of the Transactions of the Society, and such other Statistical Publications as they may determine upon, and may from time to time pay such sums to Editors and their assistants, whether Fellows of the Society or not, as may be deemed advisable.

31. All communications to the Society are the property of the Society, unless the Council allow the right of property to be specially reserved by the Contributors.

REGULATIONS OF THE LIBRARY.

1. The Library and the Reading Room are open daily for the use of Fellows from 10 a.m. till 5 p.m., except on Saturdays, when they are closed at 2 p.m.

2. Fellows of the Society are permitted to take out Books on making personal application, or by letter addressed to the Librarian, all expenses for carriage being paid by the Fellows.

3. Fellows are not to keep any books longer than one month. Any Fellow detaining a book for more than a month shall not be permitted to take another from the Library until the book detained shall have been returned.

4. Scientific Journals and Periodicals are not circulated until the volumes are completed and bound.

5. Cyclopædias and works of reference are not circulated, but may be lent on the written order of an Honorary Secretary for a period not exceeding *seven* days. The Assistant Secretary or Librarian is allowed at his discretion to lend works of reference for a period not exceeding *three* days, reporting at the same time to the Honorary Secretaries. If works so lent be not returned within the specified time, the borrower shall incur a fine of one shilling per day per volume for each day they are detained beyond the time specified.

6. Any Fellow damaging or losing a book, either replaces the work, or pays a fine equivalent to its value.

7. Books taken from the shelves for reference, are *not* to be replaced, but must be laid on the Library table.

8. The Librarian shall report to the Council any infringement of these regulations, and lay upon the table at each regular Meeting (*a*) a List of any "Works of Reference" that may have been borrowed, and (*b*) a List of Books that have been out more than a month.

DONORS TO THE LIBRARY.

During the Year (ending 15th September) 1897.

(a) **Foreign Countries.**

Argentine Republic—
General Statistical Bureau.
National Health Department.
Buenos Ayres, Provincial and Municipal Statistical Bureaus.
Tucuman, Provincial Statistical Bureau.

Austria and Hungary—
Central Statistical Commission.
Ministry of Agriculture.
" Finance.
Statistical Department of the Ministry of Commerce.
Bohemian Statistical Bureau.
Bosnia and Herzegovina Statistical Bureau.
Hungarian Statistical Bureau.
Brünn Statistical Bureau.
Budapest Statistical Bureau.
Prague Statistical Bureau.

Belgium—
Bureau of General Statistics.
Administration of Mines.
Belgian Labour Department.
Brussels Bureau of Hygiene.
Hasselt, The Burgomaster.
Institute of Social Science.
Royal Academy of Sciences.

Bulgaria. Statistical Bureau.

Chile. The Director-General of Prisons.

China. Imperial Maritime Customs.

Denmark—
Royal Statistical Bureau.
Copenhagen Statistical Bureau.
Political Economy Society.

Egypt—
Department of Public Health.
Director-General of Customs.
" Post Office.
Ministry of Finance.
Egyptian Institute, Cairo.

France—
Director-General of Customs.
Director of the Mint.
French Labour Department.
Ministry of Agriculture.
" Finance.
" The Interior.
" Justice.
" Public Works.
Paris Statistical Bureau.
Economiste Français, The Editor.
Journal des Economistes, The Editor.
Monde Economique, The Editor.
Réforme Sociale, The Editor.
Rentier, Le, The Editor.
Polybiblion, Revue Bibliographique Universelle, The Editor.
Revue d'Economie Politique, The Editor.
Revue Géographique Internationale, The Editor.
Statistical Society of Paris.
Free School of Political Science.
Musée Social, Paris.

During the Year 1896-97—*Contd.*

(a) **Foreign Countries**—*Contd.*

Germany—
Imperial Health Bureau.
„ Insurance Bureau.
„ Judicial Bureau.
„ Statistical Bureau.
German Consul-General, London.
Prussian Royal Statistical Bureau.
Saxony Royal Statistical Bureau.
Berlin Statistical Bureau.
Dresden Statistical Bureau.
Frankfort Chamber of Commerce.
„ Statistical Bureau.
Hamburg Statistical Bureau.
Hanover Statistical Bureau.
Magdeburg Statistical Bureau.
Strassburg Statistical Bureau.
Stuttgart Statistical Bureau.
Allgemeines Statistisches Archiv, The Editor.
Archiv für Soziale Gesetzgebung, &c., The Editor.
Jahrbuch für Gesetzgebung, &c., The Editor.
Jahrbücher für Nationalökonomie und Statistik, The Editor.
Vierteljahrsschrift für Staatswirtschaft, &c., The Editor.
Zeitschrift für die gesamte Staatswissenschaft, The Editor.
German Gold Standard Defence Association.
Geographical and Statistical Society of Frankfort.

Greece. Statistical Bureau.

Guatemala. Statistical Bureau.

Italy—
Director-General of Statistics.
„ Agriculture.
„ Customs.
Economista, The Editor.
Giornale degli Economisti, The Editor.

Japan—
Agricultural and Commercial Department.
Bureau of General Statistics.
Tokyo Statistical Society
„ The Prefect of.

Mexico. Statistical Bureau.

Netherlands—
Central Statistical Commission.
Department of the Interior.
„ Finance.
Director-General of Customs.
Post Office Savings Banks Department.
Amsterdam Statistical Bureau.

Norway—
Central Statistical Bureau.
Christiania Health Department.

Portugal. General Statistical Bureau.

Roumania—
Statistical Bureau.
Bucharest Statistical Bureau.

Russia—
Central Statistical Committee.
Controller of the Empire.
Customs Statistical Bureau.
Ministry of Finance.
Bulletin russe de Statistique financière, The Editor.
Finland Geographical Society.
Statistical Bureau.

Servia. Statistical Bureau.

Spain—
Director-General of Customs.
Geographical Soc. of Madrid.

Sweden—
Central Statistical Bureau.
Stockholm Health Department.

During the Year 1896-97—*Contd.*

(a) **Foreign Countries**—*Contd.*

Switzerland—
Federal Assurance Bureau.
„ Statistical Bureau.
„ Department of Customs
Statistical Society.
Swiss Union of Commerce and Industry.
Aargau Statistical Bureau.
Geneva Public Library.

United States—
Bureau of Education.
„ Ethnology.
„ Foreign Commerce.
Commissioner of Labor.
Comptroller of the Currency.
Department of Agriculture.
Director of the Mint.
Naval Observatory.
Secretary of the Treasury.
„ Interior.
Surgeon-General, U. States Army.
Statistical Bureau, Treasury.
Volta Bureau.
California. Bureau of Labor Statistics.
Connecticut—
State Board of Health.
Bureau of Labor Statistics.
Illinois. Bureau of Labor Statistics.
Indiana. Bureau of Labor Statistics.
Iowa. Bureau of Labor Statistics.
Kansas. Bureau of Labor Statistics.
Maine. Bureau of Labor and Industrial Statistics.
Maryland. Bureau of Industrial Statistics.
Massachusetts—
Board of Arbitration.
Board of Health, Lunacy, &c.
Bureau of Labor Statistics.

United States—Contd.
Michigan. Bureau of Labor and Industrial Statistics.
Division of Vital Statistics.
Minnesota. Bureau of Labor Statistics.
Missouri. Bureau of Labor Statistics.
Nebraska. Bureau of Labor and Industrial Statistics.
New Hampshire. Bureau of Labor Statistics.
New Jersey. Bureau of Labor Statistics.
New York State Library.
„ Bureau of Labor.
North Carolina. Bureau of Labor Statistics.
Ohio. Bureau of Labor Statistics.
Pennsylvania. Bureau of Industrial Statistics.
Wisconsin—
Bureau of Labor Statistics.
State Board of Health.
Brooklyn Superintendent of Police.
Bankers' Magazine, The Editor.
Bradstreet's Journal, The Editor.
Commercial and Financial Chronicle, The Editor.
Engineering and Mining Journal, The Editor.
Journal of Political Economy, The Editor.
Political Science Quarterly, Columbia College, The Editor.
Quarterly Journal of Economics, The Editor.
Yale Review, The Editor.
Academy of Arts and Sciences.
„ Political and Social Science.
Actuarial Society of America.
Economic Association, Baltimore.

During the Year 1896-97—*Contd.*

(a) **Foreign Countries**—*Contd.*

United States—Contd.
Geographical Society, New York
Philosophical Society, Philadelphia.
Statistical Association, Boston.
Columbia College, New York.
Leland Stanford Junior University.
Reform Club, New York.

United States—Contd.
Smithsonian Institution.
Yale University.

Uruguay—
Statistical Bureau.
Director of Civil Registration.
Education Department.
Montevideo Statistical Bureau.

(b) **India, and Colonial Possessions.**

India, British—
Director-General of Statistics.
Finance and Commerce Depart.
Revenue and Agricultural Department.
Lieutenant-Governor of Bengal.
Bengal, The Collector of Customs.
Indian Engineering, The Editor.
Asiatic Society of Bengal.
Bombay Branch of the Royal Asiatic Society.

Canada—
Department of Agriculture.
High Commissioner, London.
Ontario Bureau of Industries.
Insurance and Finance Chronicle, The Editor.
Royal Society of Canada.

Cape of Good Hope—
Agent-General for the Cape.
Colonial Secretary.

Ceylon—
Lieut.-Governor and Colonial Secretary.
General Manager of Government Railways.

Jamaica. Registrar-General of.

Mauritius—
H.E. The Governor of.
The Colonial Secretary

New South Wales—
Agent-General, London.
Government Statist, Sydney
Department of PublicInstruction.

New Zealand—
Registrar-General.
Registrar of Friendly Societies.
Department of Mines.
Labour Department.
Colonial Museum, Wellington.
New Zealand Institute.
Trade Review, The Editor.

Queensland—
Agent-General, London.
Registrar-General of.

South Australia—
The Chief Secretary.
The Registrar-General

Straits Settlements. The Government Secretary, Perak.

Tasmania—
Government Statistician, Hobart.
Royal Society of Tasmania.

During the Year 1896-97—*Contd.*

(b) **India, and Colonial Possessions**—*contd.*

Victoria—
Hon. the Premier of Victoria.
Assist. Government Statist.
Royal Society of Victoria.
Public Library, &c., Melbourne.

Victoria—Contd.
Melbourne Exhibition Buildings, The S cretary.

Western Australia. The Government Actuary.

(c) **United Kingdom and its several Divisions.**

United Kingdom—
Admiralty Medical Department.
Board of Agriculture.
Army Medical Department.
„ Veterinary Department.
Board of Trade.
British Museum.
Customs, Commissioners of.
Home Office.
India Office.
Labour Department.
Local Government Board.
Metropolitan Asylums Board.
Royal Mint.
War Office.
Woods, Forests, &c., H.M.

England—
Registrar-General of England.
London County Council.
London School Board.
Battersea, The Vestry of.
Fulham Free Public Library.
Wandsworth Board of Works.
Birmingham City Treasurer.

England—Contd.
Liverpool Free Public Library.
Manchester Free Public Library.
The Medical Officer of Health of the Local Government Board and of the following towns: Birkenhead, Birmingham, Bolton, Bradford, Brighton, Bristol, Cardiff, Derby, Halifax, Huddersfield, Hull, Leeds, Leicester, Liverpool, Manchester, Newcastle-on-Tyne, Norwich, Nottingham, Oldham, Portsmouth, Preston, Richmond, Salford, Sunderland, Wolverhampton.

Ireland. Registrar - General of Ireland.

Scotland—
Registrar-General of Scotland.
Edinburgh City Chamberlain.
Aberdeen Medical Officer.
Glasgow Medical Officer.

(d) **Authors, &c.**

Allard, A., Brussels.
Atkinson, Dr. Edward, U.S.A.
Back, Frederick, Tasmania.
Baden - Powell, Sir George, K.C.M.G., M.P.
Barclay, Robert, Manchester.
Barr, A. W., London.
Becker, Dr. Charles, Berlin.
Bertillon, Dr. J., Paris.
Billings, Dr. J. S., Washington.

During the Year 1896-97—*Contd.*

(d) **Authors, &c.**—*Contd.*

Blenck, Herr E., Berlin.
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Boinet, A., Bey, Cairo.
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Boutcher, Mortimore, & Co., London.
Brassey, Lord, Melbourne.
Broomhall, George J. S., Liverpool.
Brough, B. H., London.
Carter, J. R., London.
Cassell & Co., London.
Cheysson, E., Paris.
Coghlan, T. A., Sydney.
Cohn, Dr. Gustav, Germany.
Coni, Dr. E. R., Buenos Ayres.
Conrad, Dr. J., Jena.
Cooper, Joseph, Farnworth.
Cox, Harold, London.
Craigie, Major P. G., London.
Crawford, R. F., London.
Crupenski, C., Roumania.
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Da Veiga Filho, Dr. J. P., Brazil.
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Doyle, Patrick, Calcutta.
Dun & Co., Messrs. R. G., U.S.A.
Eaton & Sons, Messrs. H. W., London.
Ellison & Co., Messrs., Liverpool.
Ely, Dr. Richard T., U.S.A.
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Ferraris, C. F., Venice.
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Gad, M. Marius, Copenhagen.
Garland, N. S., Ottawa.
Gooch, Thomas & Sons, London.
Gow, William, London.
Gow, Wilson, & Stanton, Messrs.
Grimshaw, Dr. T. W., Dublin.
Guillaume, Dr. Louis, Bern.
Guillaumin et Cie., Messrs., Paris.
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Hartland, E. Sidney,
Helmuth Schwartze & Co., Messrs.
Hewat, Archibald, Edinburgh.
Hewins, W. A. S., M.A., London.
Hitchings, A. S. H., Rio.
Hoar, Hon. George F., U.S.A.
Hoffman, F. L., New York.
Hooker, R. H., M.A., London.
Houdard, Adolphe,
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Hyde, John, U.S.A.
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Issajew, Dr. A. A, Berlin.
Janssens, Dr. E., Brussels.
Jeans, J. S., London.
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Johnston, R. M., Hobart.
Juglar, Dr. Clément, Paris.
Juraschek, Dr. F. v., Vienna.
Kelly, Charles, M.D., F.R.C.P.
Keltie, J. Scott, London.
Kemp & Co., John, London.
Kemper, Dr. G. de Bosch.
Kiær, M. A. N., Christiana.
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Kummer, M. J. J., Bern.
Latzina, Dr. F., Buenos Ayres.
Leemans, M. H., Brussels.
Leroy-Beaulieu, M. Paul, Paris.
Liroth, Dr. K., Stockholm.
Macmillan & Co., Messrs., London.
Marshall, J. E., Alexandria.
Mataja, Dr. Victor,
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Methuen & Co., Messrs., London.
Milliet, M. E. W., Bern.
Mitchell & Co., Messrs., London.

During the Year 1896-97—*Contd.*

(d) **Authors, &c.**—*Contd.*

Molinari, M. G., Paris.
Money, Alonzo, C.B., Cairo.
Morgan, Percy C., London.
Morrison, Rev. W. D., London.
Moss & Co., Messrs. R. J., Egypt.
Mulhall, M. G., Dublin.
Mullins, Dr. G. L., Sydney.
Newsholme, Dr. A., Brighton.
Neymarck, A., Paris.
Norman, J. H., London.
O'Conor, J. E., C.I.E., India.
Page & Gwyther, Messrs., London.
Palmer, Sir E. M., K.C.M.G., Cairo.
Pareto, Vilfredo, Italy.
Paul, Alexander, London.
Petersen, Aleksis, Copenhagen.
Pierson, Israel C., New York.
Pistorius, Dr. Verkerk, The Hague
Pittar, T. J., London.
Pixley & Abell, Messrs., London.
Plehn, Carl C., New York.
Poland, John, London.
Powell, Messrs. T. J. & Co., London.
Power, L. G., U.S.A.
Price, L. L., M.A., Oxford.
Ravenstein, E. G., London.
Rawson, Sir R. W., K.C.M.G., C.B.
Ronald & Rodger, Messrs., Liverpool.
Rothwell, R. P., New York.
Sachs, E. O., London.
Sassen, M. Armand, Amsterdam.
Sauerbeck, A., London.
Schmoller, Dr. G., Germany.
Seligman, Prof. E. R. A., New York.
Seyd, Richard, London
Shillito, J., York.
Sidenbladh, Dr. K., Stockholm.
Sidgwick, Henry Cambridge.
Smith, C. W., London.
Stanton, A. G., London.
Stewart, R. S., London.
Strachan, T. Y., Newcastle-on-Tyne.
Susini, T., Buenos Ayres.
Thomas, D. A., Newport.
Thompson, W. J. & Co., London.
Thornton, James H., London.
Troïnitsky, M. N., St. Petersburg.
Urmson, Elliot, & Co., Liverpool.
Velasquez, J., Buenos Ayres.
Verney, Sir Edmund, Winslow.
Wadlin, H. G., Boston, U.S.A.
Weddel & Co., W., London.
Weedon, Thornhill, Queensland.
Whiteley, William, London.
Wilbur, Dr. C. L., U.S.A.
Williams, W. R., London.
Williams and Norgate, London.
Woodworth, Arthur V., London.
Wright, Hon. C. D., Washington.
Yvernès, M., Paris.

(e) **Societies, &c. (British).**

Accountants & Auditors, Society of.
Actuaries, Institute of.
Anthropological Institute.
Arts, Society of.
Bankers, Institute of.
Bimetallic League.
British Economic Association.
„ Iron Trade Association.
„ Association.
Charity Organisation Society.
Chartered Accountants, Institute of.
Civil Engineers, Institution of.
Cobden Club.
East India Association.
Federated Institution of Mining Engineers.
Glasgow Philosophical Society.
Howard Association.

During the Year 1896-97—*Contd.*

(e) **Societies, &c. (British)**—*Contd.*

Imperial Institute.
Incorporated Accountants' Society.
International Statistical Institute.
Iron and Steel Institute.
Liverpool Lit. and Phil. Society.
London Chamber of Commerce.
„ Hospital.
Manchester Lit. and Phil. Society.
„ Statistical Society.
Middlesex Hospital.
Mitchell Library, Glasgow.
Peabody Donation Fund.
Royal Agricultural Society.
„ Asiatic Society.
„ College of Physicians.
„ College of Surgeons.
Royal Colonial Institute.
„ Geographical Society.
„ Institution of Great Britain.
„ Irish Academy.
„ Society, Edinburgh.
„ Society, London.
„ United Service Institution.
St. Bartholomew's Hospital.
Sanitary Institute of Great Britain.
Society for Propagation of the Gospel in Foreign Parts.
Statistical and Social Inquiry Society of Ireland.
Surveyors' Institution.
University College, London.

(f) **Periodicals, &c. (British).** *The Editors of*—

Accountant, The, London.
Athenæum, The, London.
Australian Trading World, The, London.
Bankers' Magazine, The, London.
British Trade Journal, The, London.
Building Societies, &c., Gazette, The.
Colliery Guardian, The, London.
Commerce, London.
Commercial World, The, London.
Economic Review, The, London.
Economist, The, London.
Finance Chronicle, The, London.
Fireman, The London.
Incorporated Accountants Journal.
Insurance Post, The, London.
Insurance Record, The, London.
Investors' Monthly Manual, The.
Iron and Coal Trades' Review, The,
Johannesburg Standard, &c., The. London Edition.
Licensing World, The, London.
Machinery Market, The, London.
Nature, London.
Policy-Holder, The, Manchester.
Post Magazine, The, London.
„ Almanack, London.
Review, The, London.
Sanitary Record, The, London.
Sell's Dictionary of the World's Press, London.
Shipping World, The, London.
Statist, The, London.

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